DOCUMENT RESUME

ED 070 093 CS 200 263

AUTHOR	O'Donnell, Roy C.; And Others
TITLE	Syntax of Kindergarten and Elementary School Children: A Transformational Analysis.
INSTITUTION	National Council of Teachers of English, Champaign, Ill.
REPORT NO	NCTE-RR-8
PUB DATE	67
NOTE	123p.
AVAILABLE FROM	National Council of Teachers of English, 1111 Kenyon Road, Urbana, Ill. 61801 (Stock No. 16208, $2.00 non-member, $1.80 member)
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	Comparative Analysis; Elementary School Students; *English; *Evaluation Techniques; Language Ability; Language Development; *Language Research; Language Usage; *Linguistic Patterns; Oral Expression; Sex Differences; Skill Analysis; *Syntax; Transformation Generative Grammar; Written Language
IDENTIFIERS	Hunt (Kellogg W.)

ABSTRACT

This investigation sought to learn about the oral and written language behavior of students from kindergarten age through grade 7, and to determine the validity of different analytic techniques for measuring children's development in control of syntax. Language samples were collected from 180 children (grades K-3, 5, and 7) by having the children view two silently-run cartoons, and then narrate and answer questions about the film in a recorded interview. Third-, fifth-, and seventh-graders were also asked to write the stories and answers. The typescripts of the responses were analyzed using Hunt's T-units. Principal conclusions were: (1) as grade level increased, so did the word length of total responses to a situation; (2) the most frequent significant increments from grade to grade were in the use of particular complex constructions; (3) deletion transformations may indicate students' growth in manipulating syntax better than subordinate clauses; (4) oral expression appeared to progress most rapidly between kindergarten and the end of first grade, and between the ends of the fifth and seventh grades; (5) in the higher grades, written development in control of syntax surpassed spoken development. (This document previously announced as ED 017 508.) (MM)

SYNTAX OF KINDERGARTEN AND ELEMENTARY SCHOOL CHILDREN: A TRANSFORMATIONAL ANALYSIS

ROY C. O'DONNELL, WILLIAM J. GRIFFIN, AND RAYMOND C. NORRIS
George Peabody College for Teachers

NCTE Research Report No.8

NATIONAL COUNCIL OF TEACHERS OF ENGLISH
508 South Sixth Street, Champaign, Illinois 61820

NATIONAL COUNCIL OF TEACHERS OF ENGLISH

symbolizes the development of several healthy trends in research in the teaching of English. It attempts to describe one of the basic processes in English—the development of syntactic structures in children's written and oral narration; and we need research on basic process at this time almost more than we do research in teaching methods and curriculum, which logically should stem from basic research. The report builds upon preceding research, especially upon the work of Hunt (NCTE Research Report No. 3), in part replicating his study with different subjects and extending his analyses to younger children and to their oral as well as their written composition. The report is also somewhat refreshing these days because it represents the work of a team of investigators supported by a private foundation, when much research in English is either funded by the federal government or conducted by an individual in pursuit of an advanced degree.

In their study, O'Donnell, Griffin, and Norris analyzed the language of 180 boys and girls from white middle class families in Murfreesboro, Tennessee—30 children each in kindergarten and in Grades 1, 2, 3, 5, and 7. The language samples were collected during March, 1965, by having three children at a time view a motion picture (with the sound track turned off), then privately tell the story of the film to an interviewer and answer certain questions related to the narrative, these oral responses being recorded on tape. The children in grades 3, 5, and 7 were also asked to write the story of the film and answers to the same questions. This procedure was followed with each of two animated cartoons of Aesop fables. Typescripts of the oral and written responses (the oral responses typed without punctuation) were then divided into T-units, each of which was analyzed for the type of sequential pattern of the main clause and for the number, kinds, and functions of sentence-combining transformations the T-unit contained. The mean number of words per T-unit and the mean number of sentence-combining transformations per 100 T-units were also calculated.

Many findings of the study are quite striking. A few are summarized inside the back cover of this book.

As the investigators themselves warn, readers of this report

should remember a few caveats. The selection of children at each level was largely uncontrolled, suggesting that the means reported for each grade level do not necessarily represent clearly defined populations. Not based on a longitudinal study in which the same children are followed from year to year as they progress from grade to grade, this report should not be construed to mean that; the third graders in this report may well produce different data when they reach fifth grade than the fifth graders did in this report. Finally, individual ranges that are reported show a good deal of overlapping from grade to grade, and the reader must keep in mind the probability of such overlapping at points where they are not reflected in the data; individual children probably do not develop their syntactic structures as consistently as this report may seem to some readers to imply. But these caveats should in no way be interpreted as undermining the significance of this study, especially for future investigations, using similar procedures, which are longitudinal in nature and especially which include some case studies of individual children, attempting to determine what factors influence their syntactic development and what such development signifies for the effectiveness of their communication.

—Richard Braddock, Chairman
Committee on Research

Iowa City, Iowa

ACKNOWLEDGMENTS

Numerous individuals have contributed to the conduct of this investigation. It would have been impossible without the aid of Rupert Klaus, School Psychologist, and the cooperation of teachers and pupils of the Mitchell-Neilson School in Murfreesboro, Tennessee. Among those whose personal as well as professional interest was enlisted in the language analyses and the preparation of the report, special mention must be made of David Shores and Douglas Crenshaw, graduate students at George Peabody College for Teachers.

Grateful acknowledgment is here made of the generous help of Kellogg W. Hunt. His own study of children's writing is a model that in many respects has been followed here. Fully as important, however, have been his consistent, continuing interest, encouragement, and advice.

This study was a project of the School Learning Institute at George Peabody College for Teachers. It was made possible by funds granted by the Carnegie Corporation of New York. The authors, of course, are solely responsible for statements made and views expressed in the report.

R. C. O'Donnell
W. J. Griffin
R. C. Norris

Nashville, Tennessee

TABLE OF CONTENTS

TABLES

FIGURES

CHAPTER I

INTRODUCTION

The investigation reported here had two general purposes. One was to find out more about the characteristic exploitation of the syntactic resources of English (a) in speech and writing (b) by boys and girls (c) at various age-grade levels. The other was to examine the validity of certain indices proposed as reliable, easily observable, objective measures of children's development in control of syntax. The subjects were 180 children in kindergarten and five selected school grades (1, 2, 3, 5, and 7).

The questions motivating the study were formulated as follows:

1. Are there identifiable differences that can be quantified in grammatical structures used by children at various age-grade levels?
2. Is it possible to define a sequence in children's acquisition of a productive repertory of syntactic structures?
3. If children's exploitation of the syntactic possibilities shows measurable growth in the elementary school years, is the growth gradual and consistent, or are there periods of relatively more rapid development?
4. Do children's writing and their oral expression differ significantly in syntactic structures?
5. Do boys and girls at various grade levels differ significantly in the use of syntactic structures?
6. Is there a simple objective measure that has special claim to validity and reliability as an indicator of children's development of syntactic control?

Such questions have also been asked by other investigators. The search for answers to five of the queries has resulted in accumulation of a great variety of data, particularly on the language of very young children. Comparisons of syntax in speech and writing have been relatively few, but a great deal has been reported on each mode of expression separately. All the questions, however, deserve repeated consideration with application to children of particular types and differing age groups behaving under varied circumstances. New approaches to the problem of securing answers may yield significant results. Aside from the fact that a topic as important as children's language development demands continuing research,

justification for the present study may be found in its combination of several features:

1. Oral and written language samples were collected under carefully planned and uniformly controlled conditions. Responses were elicited by stimuli designed to minimize differential effects of the experimental situation on children of different sexes and with different experiences and interests. The children's language behavior was not crucially dependent on rapport with the investigators. Conditions under which the responses were obtained can be clearly described and readily replicated.
2. Under such controlled conditions, both oral and written language samples were collected in Grades 3, 5, and 7. Precautions were taken to assure comparability between responses in the two modes of expression. Since the numbers of boys and girls were approximately equal in each of the six grade groups, a meaningful study could be made of the interaction of syntactic structures with mode of expression and sex over a wide range of grade levels.
3. The basic syntactic unit on which most of the analysis in the study is based was clearly and unambiguously defined. Evidence indicates that it is a particularly appropriate unit to use in the exploration reported here.
4. The syntactic analysis that constituted the core of the investigation was based on certain concepts of transformational grammar. The method of analysis follows, in part, that adopted by Hunt (1964, 1965) in his study of written compositions produced by children in Grades 4, 8, and 12. This report, therefore, complements that of Hunt, insofar as it deals with writing. No closely comparable study of children's oral expression appears yet to have been made, though Menyuk (1961, 1963a, 1963b, 1964a, 1964b) has performed transformational analyses of the language of children in nursery school, kindergarten, and first grade.

Related Studies: Traditional and Structural

Scores of studies of children's language behavior that have had some similarity to the present investigation can be found in the literature. An excellent account of earlier applications of objective measures to syntactic characteristics of children's writing is incorporated into the introduction to Heider and Heider's (1940) report of sentence structure in compositions of deaf and hearing children. Their account was usefully supplemented by Harrell (1957), whose own study was a comparison of the development in oral and written language of children aged from 9 through 15. He pointed out that the only previous similar comparison over a wide grade range had been made by Lull (1929), whose observations were imprecise and loosely organized. Bushnell (1930), it is true, compared the speech and writing of tenth grade students, and Davis (1941) produced a statistical study of clauses in oral and written compositions that had formed a part of Bushnell's published report.

Comprehensive reviews of the literature on language development in children, with special attention to the numerous studies of speech production at early ages, have been published by McCarthy (1954), by Carroll (1960), and by Ervin and Miller (1963). Recent studies of the language of school age children, not dealt with in those summaries, have been reported by Strickland (1962), Loban (1961, 1963, 1964), Menyuk (1961, 1963a, 1964a, 1964b), Hocker (1963), Hunt (1964, 1965), and Sam and Stine (1965).

Although techniques of modern linguistic science were earlier applied in investigations of the speech of very young children, particularly those relating to phonetics, before 1960 the influence of that science was rarely detectable in reports on the language of older children. Aside from vocabulary analysis and calculations of egocentricity or socialization that followed Piaget's work, pre-1960 studies were characteristically concerned with length of total responses; length of "sentences"; tabulation of frequencies of simple, compound, complex, and incomplete sentences; distribution of declarative, imperative, and exclamatory sentences; kinds of subordinate clauses and their ratios to each other and to main clauses; relative frequencies of eight (sometimes nine) parts of speech, often with special attention to verb types and verb phrases; and the cataloging of errors in morphology and syntax—at least, what were taken to be errors.

In the earlier studies, recognition of the inadequacies of tra-

ditional grammatical categories is not absent. Some investigators took pains to explain what they regarded as a sentence, as did, for example, Heider and Heider (1940)—without, however, eliminating subjectivity and doubtful judgments. Davis (1937) set up rules for "sentence-division" in speech that have been followed by other researchers, most recently by Templin (1957); but those rules, partly based on prosodic features that today would be called terminal junctures, left the way open for arbitrary decisions. "When one simple sentence was followed by another with no pause for breath, they were considered one sentence *if the second was clearly subsidiary to the first*" (Davis, 1937, p. 44; italics supplied). But what is clear to one analyst may not, of course, be at all clear to another. Again, the inadequate traditional descriptions of syntactic structures led McCarthy (1930) to introduce such designations as "simple sentence with phrase," and "elaborated sentence," as well as the less ambiguous "sentence functionally complete but structurally incomplete." Her terminology was adopted by other investigators (*e.g.*, Day, 1932; Davis, 1937; Shire, 1945; Hahn, 1948; Anastasi & D'Angelo, 1952; and Templin, 1957), but what they classified under such rubrics have not always been the same things. It may also be remarked that the concern of researchers with the mere incidence of parts of speech, which seems to have been fostered by the character of traditional school grammars, has long been recognized to have produced little enlightenment on language development of school age children. (See McCarthy, 1954, pp. 556-557.)

Conventional analyses of language production have yielded a great deal of important information and may yet yield more; but refined procedures in the description of children's language growth have obviously been needed. It is noteworthy that no study of the subject reported since 1960 has confined its analysis to the traditional categories. The research of Loban (1961, 1963, 1964), Strickland (1962), Hocker (1963), Riling (1965), and Sam and Stine (1965) applied systems of analysis derived from structural linguistics. The investigations of Menyuk (1961, 1963a, 1964a, 1964b) and Hunt (1964, 1965), by contrast, employed modes of analysis that were suggested by the transformational grammars now being developed by such men as Chomsky (1957, 1965) and Lees (1960, 1961). The present study is most closely associated with this latter development.

Simplicity of analytical procedures distinguishes the study of writing in Grades 4, 5, and 6 reported by Sam and Stine (1965) from

other structuralist investigations of children's use of language. Compositions studied were produced by 300 Pennsylvania children (50 boys and 50 girls in each grade) in response to a story completion assignment. Sam and Stine identified all clauses and classified their structural patterns as belonging to six different types. They also computed the frequencies of four kinds of main clause modification in a 20 percent systematic random sample of all the sentences. Their findings may be briefly summarized.

Clauses containing two complements following a transitive verb were infrequent in the compositions studied; no statistically significant differences were observed in their use in various grades or by boys and girls. The incidence of statements in inverted order was also low in all grades, but they were employed with significantly greater frequency by girls than by boys. Girls also made significantly greater use of clause structures in which the subject is followed by an intransitive verb, in which a transitive verb is followed by a direct object, and in which a linking verb is followed by an adjectival complement. The latter three structure patterns, as well as that in which a linking verb is followed by a nominal complement, were used with notably (in some instances, significantly) increasing frequency in successive grades. Interpretation of these findings must take into account the facts that a greater quantity of writing was produced in each successive grade and that girls wrote more than boys did in each grade. The investigators found that none of the kinds of clausal modification they identified (verbals, subordinate clauses, prepositional phrases, and adverbs) were very frequently used in any grade or by any subgroup; only negligible differences in incidence were observed.

Strickland's study (1962) was partially concerned with language in elementary school reading textbooks, but insofar as she dealt with the observed language of children, she based her investigation on twenty-five "phonological units" elicited by interviewers from each of her 575 subjects, who were enrolled in the first six grades of schools in Bloomington, Indiana. The identification of phonological units, frequently called sentences in Strickland's report, is described in terms of modern structural linguistics, though the description (p. 16) makes it clear that judgments were sometimes based on interpretation of meaning as well as on intonations, junctures, and silence-boundaries. Mean word-length of phonological units was computed for each grade and for subgroups within the grades.

Since English grammar allows an unlimited number of coordinations of main clauses (either with or without conjunctions) within such phonological units, and since even casual observation shows that younger children often (by more mature standards) make excessive use of those coordinations, it is not surprising to find that "Length of phonological unit appeared in this study to be unsatisfactory as a measure of the maturity of language" (Strickland, 1962, p. 60).

Setting aside very short, structurally incomplete response utterances and word "mazes" (vocalizations not "syntactically or meaningfully pertinent"), Strickland made a two-level analysis of syntactic structures, with close attention to the relative positions of units within structures. On the first level, she classified and tabulated (a) "fixed slots" and the items that filled them, (b) types and positions of "movables," and (c) "sentence connectors." Fixed slots, in the terminology she adopted, are positions occupied by "question words," grammatical subjects, certain verbal auxiliaries and adverbial elements in "merged verbs," main verbs, and complements of the kinds often called indirect objects, direct objects, and subjective complements. A special subslot was recognized as receptive of passive verbs, copulative verbs, or verbs of the *to be* class, but no distinction was made between nominal and adjectival subjective complements, and what is often called the object complement was regarded simply as part of the expression filling the direct object slot. Movables—which, in fact, are sometimes immovable—are expressions usually regarded as adverbial. Sentence connectors include both conjunctive expressions that tie main clauses together and those that join "a causative subordination to the rest of the sentence" (Strickland, 1962, p. 21). The second level of analysis identified and described fifteen types of satellites or subordinate elements used in the fixed slots and movable units. It is clear that Strickland's procedure allowed a very complex account of children's syntax.

Indeed, her report that the number of language patterns (by which she meant arrangements of items identified in her first-level analysis) ranged from 658 in the first grade to 1,041 in Grade 6 suggests the question of whether a simpler description would have been more useful. Such an increase in the number of finely differentiated arrangements of syntactic units, however, tells us something about the development of children's language production. Strickland also reported that five or six patterns were distinct favorites at all

grade levels and that the patterns of highest frequency rank were all composed of "immovable elements (slots)" (p. 60). Though frequency ranks of those patterns did not change much from grade to grade, among the twenty-five patterns ranking highest in later grades were ten that did not appear at all in the speech of first graders. A study of frequencies in the use of "sentence patterns" by subgroups differentiated on the basis of verbal intelligence, nonverbal intelligence, and total intelligence scores yielded little information that the investigator considered important.

As for the use of movables, Strickland (like a number of other investigators) observed that while school age children at every grade level employed adverbial expressions of the various types (most often those denoting time and place), the incidence of movables increased with advances in grade. Older children also demonstrated greater flexibility in positioning these expressions, especially in varying the position of those relating to time. Some characteristic differences in the forms of adverbials of manner used by older children were noted, as compared with those used by first graders. In a special study of subjects in Grades 1, 4, and 6, statistically significant interaction in at least two grades was found between the use of movables and the variables of verbal intelligence, mental age, and parents' education.

Strickland's report on subordinate elements (level-two analysis) was very brief; she found "no outstanding difference in the use of these elements from one grade level to another . . ." (p. 44). In her special study of language production in Grades 1, 4, and 6, however, she found statistically significant correlations in at least two of the grades between differences in the use of subordination patterns and differences in chronological age, verbal intelligence, nonverbal intelligence, total intelligence, mental age, parents' occupational status, and mothers' education.

Strickland presented no data on differences between boys and girls in the use of language. Neither did Hocker (1963), the nature of whose study also prevented grade level comparisons. Hocker based her investigation on a loosely controlled collection of 2,500 phonological units produced under widely-varying conditions by some forty first graders in Arizona. She was interested in the children's vocabulary and morphology, in the proportions of rhetorical types of sentences, and in sentence functions of the kind described by Piaget; but she also computed the mean word-length of phonological

units (which she found to be 4.86) and made a syntactic analysis of the materials collected. Some of the findings and implications of her study are discussed by Strang and Hocker (1965).

Hocker applied methods used by Strickland, not only in exploiting the concept of the phonological unit but, also, in the two-level study of syntactic structure. Like Strickland, she reported much more fully on the first-level analysis (slot-fillers and movables) than on the second-level analysis (subordinate elements and their constituents). She found that in the language samples she studied, children used 331 different arrangements of syntactic items (which she calls sentence patterns). She reported that 3 of those patterns were by all odds the favorites, each occurring more than 100 times. The rank orders of positional patterns observed most frequently in the speech of first grade children in Arizona and in Indiana are a little different, and the fact that the fifth most frequent pattern recorded by Hocker is that of what she calls hortatory sentences (simply verb-object) emphasizes the wide difference in conditions under which the two collections of language samples were obtained.

Another study that closely followed Strickland's procedures is that of Riling (1965), which was also, in part, concerned with a comparison of children's language with that of their textbooks. Riling's investigation, however, had several distinctive features. Subjects were children representing a very wide mental age range in southeastern Oklahoma, 200 in Grade 4 and 100 in Grade 6. One half of the fourth graders were Negro children while the other half were "Caucasian" (as were all the sixth graders), and comparisons of the language behavior of the two groups were consistently carried out. Unlike Strickland, Riling reported fully on data for sex-differentiated subgroups. She also presented in more detail than did Strickland the results of level-two analysis (which she described as the study of "elaboration of the basic sentence elements"). Still more important is the fact that she obtained and analyzed samples of both speech and writing. Expression in the two modes was elicited under similar conditions, the stimulus in each instance being a request that the child tell a story suggested to him by a carefully chosen, colorful picture. One picture elicited oral responses from all the children; a different picture was used to stimulate writing. Speech was tape recorded and later transcribed with segmentation into phonological units. The maximum amount of language analyzed for each child was "twenty-five independent verbalizations of oral

language and twenty-five of writing. . . . No minimum amount of language to be considered was set. . . ." (Riling, 1965, p. 42).

Like Strickland, Riling reported children's use of a wide variety of arrangements of items identified in the first-level analysis, though a few such patterns were clearly predominant. She was also able to say, however, that in oral expression the Negro children in Grade 4 used 585 different order patterns, "Caucasian" children in the same grade used 713, and children in Grade 6 used 845, while the comparable figures for written expression of the same children were 344, 371, and 527. Even in Grade 4, however, some structures were prominent in writing that seldom or never appeared in speech. She further observed that in both speech and writing, children whose scores on verbal intelligence and total intelligence were in the lowest quartile never used some of the structures other children employed, and seldom used some whose frequency ranks for subjects as a whole were among the highest. Unlike Strickland, she found that structures beginning with the expletive *there* were prominent in both speech and writing. Brief phonological units introduced by *and* were very frequent in speech. Of special interest is the observation that Negro children in the fourth grade used the subject-verb-indirect object-direct object pattern with relatively high frequency in both speech and writing, by contrast to the other children in Grade 4 and those in Grade 6. Strickland had found the pattern rarely in the language she analyzed, and Loban (1964) had reported that it seldom occurred in the speech samples he collected annually in his longitudinal study of children from kindergarten through Grade 9. In writing, the Negro children studied by Riling produced a greater quantity of language than did other fourth graders, but their writing was characterized by much repetition of a few structure patterns.

Riling also found that Negro children in the fourth grade used far fewer structurally incomplete utterances in speech than their "Caucasian" contemporaries did, girls used such utterances less often than boys, and her subjects as a whole used them much less frequently than did children in comparable grades that were studied by Strickland. She reported, too, that though mazes (which she describes—pp. 72-73—as "various words and sounds which are not a part of . . . basic communication structures") were produced less frequently in speech in Grade 6 than in Grade 4, it was also true that among subjects whose scores on verbal and total intelligence were in the low quartile, Negro fourth graders used strikingly fewer mazes

than did the other children. Noting that all boys produced more mazes than did girls of the same grade and ethnic group, that the speech of children from smaller rural schools was freer from mazes than was that of children from larger schools, and that children who scored lowest on a silent reading test of paragraph comprehension and word meaning used the fewest mazes, Riling was led to question the assumption that fluency is a reliable index of maturity in the use of language.

A number of Riling's observations on children's use of movable syntactic elements parallel those of Strickland, though she also noted some possibly significant variances in the language of subgroups identified by the special factors she took notice of. Her detailed report of the second-level analysis was summarized in ten generalizations that indicated few remarkable distinctions in the language behavior of grade groups and subgroups. She did find that children in Grade 6, compared with those in Grade 4, used notably more phrases as adverbials of manner and time, and they used more clauses associated with the verb. Across the grades, children whose scores on a test of verbal intelligence were in the highest quartile used more phrases and clauses as adverbials of time in their writing than did children whose scores were in the low quartile. The children of both grades, particularly the girls, used more phrases to elaborate the grammatical subject in writing than in oral language, and the difference was most marked in the language production of Negro children in Grade 4. The Negro children also used more phrases to elaborate the complement in writing than did other children in the fourth grade, though "Caucasian" fourth graders used more such phrases than did the sixth graders.

Riling's incomplete report on the length of "sentences" illustrates the difficulties of identifying such units in children's writing and the problems of describing their writing in relation to such units, however they are defined; it also raises the question of comparability of "sentences" in writing with phonological units (which she also calls sentences) in oral expression. Applying her definition of sentences, however, she found that children in Grade 6 used longer sentences in both speech and writing than did children in Grade 4, and that the increased length was most marked in expression of sixth graders who scored in the upper quartile on a verbal intelligence test. Negro boys in the upper quartile used longer sentences in both speech and writing than did Negro girls in the same

quartile, though the same sex difference was noted only in writing among the other upper quartile children in Grade 4. In Grade 6, boys in the upper quartile used longer sentences in both speech and writing than did girls in the same quartile. Among children whose scores on the verbal intelligence test were in the low quartile, girls in each subgroup used longer sentences in both speech and writing than did the comparable boys, with the one exception that phonological units of "Caucasian" girls in Grade 4 were slightly longer than those of boys of the same ethnic group.

If greater sentence length is regarded as a mark of superiority in children's control of language (as many investigators have believed it to be), Riling's findings do not support the widespread notion that girls' command of language is generally advanced beyond that of comparable boys. Rather, Riling concluded from her study of sentence length and from confirmatory evidence observed at other points in her investigation that "When boys do well, they do better than the girls; when they do poorly, they are at the bottom of the heap" (Riling, 1965, p. 87). It is noteworthy that Loban (1964) arrived at a very similar generalization about the language of boys and girls he studied.

In 1952, Loban initiated a longitudinal study of children's language abilities that was to follow the same subjects from kindergarten through Grade 12. The original selection of 338 kindergarten pupils in Oakland, California, was stratified to represent approximately such variables in the population of the city as socioeconomic status, racial background, intellectual ability, and sex. The study was broadly designed to assess the children's speaking, reading, writing, and listening at succeeding grade levels, and to determine the interrelations among these activities as well as their correlations with such factors as scores on standard tests of intelligence and achievement, teachers' judgments, and socioeconomic status.

The reports made by Loban thus far (1961, 1963, 1964) indicate that only his study of syntactic features in speech is closely related to the present investigation. In each year of the project (at times his reports do not specify), language samples were obtained from subjects by interviewers who followed a standard schedule but were free to ask additional questions if "the purpose was solely to encourage a flow of language already on its way" (Loban, 1963, p. 3). At the beginning of the interviews, questions about playmates, games, television, illness, and personal wishes encouraged

children to talk, but the main part of the language production consisted of reactions to a series of six pictures. Responses were mechanically recorded; later, they were transcribed, with segmentation into phonological units, and submitted to further processing that generally (but not in all respects) followed procedures employed by Strickland.

It was not by chance that Loban and Strickland made use of the same system (later adopted by Hocker and Riling) of identifying phonological units and subjecting speech samples to a two-level analysis of syntax. The system was developed by a conference of linguistic specialists which was held at Indiana University in 1959 for the particular purpose of providing a uniform mode of operation for their investigations. Loban, however, was dissatisfied with the phonological unit as the sole basis for segmenting the language of his subjects, and he decided to work also with what Watts (1948) had described as "the natural linguistic unit." Loban himself called it the "communication unit" and identified it as a grammatically independent predication or an answer to a question that lacks "only the repetition of the question element to satisfy the criterion of independent predication" (Loban, 1963, pp. 6-7). His examples of segmentation make it clear that he regarded two coordinated independent clauses as two communication units. Many of his findings are reported in terms of these units.

A feature of Loban's study that is different from most other investigations of language production, and which, therefore, makes comparisons difficult, is its focus on differential behavior of subgroups that were identified by numerous measures (including teachers' judgments) as being high and low, respectively, in language ability. Much of his reporting has been done in terms of these subgroups (occasionally compared with a random sample), rather than in terms of performance within grades as wholes.

Loban (1963, pp. 83-87) summarized his findings concerning the language of elementary school children in thirty-two brief paragraphs. Those of his generalizations that are closely related to the present study have been further condensed in the following statements:

1. In each succeeding year of measurement, Loban found increases in the total number of words, the number of communication units, and the average number of words in communication units that were elicited in interviews. In the high-

ability group the increases were steady and clearly marked, while in the low-ability group the advances were smaller and some regressions occurred. The initial distinction between the two groups not only was maintained but was increased over the years.

2. Up through Grade 3, the subjects as a whole decreased the number of mazes in their verbalizations, as well as the number of words in the mazes; in the speech of the low-ability group, however, the average number of words in mazes increased. After Grade 3, both groups increased the number of mazes produced though they reduced their average number of words per maze, and the high-ability group reduced the proportion of their mazes to their total language production.

3. The low-ability group used many more incomplete sentence patterns than did the high-ability group. The latter employed sentence patterns that were built around linking verbs more frequently than did the low-ability group. Sentence patterns initiated by expletives were seldom used by the low-ability group; in the speech of the high-ability group, the use of such patterns first increased (through Grade 4), and then decreased. Object complements (which Loban, unlike Strickland, specifically identified) were used only by the ablest subjects. Indirect objects rarely appeared in the speech samples. An overall similarity in the use of positional patterns by differing ability groups was considered an important finding.

4. Marked differences between the two ability groups, however, were discovered in the constituents that filled fixed slots and movable positions. The high group consistently employed a more extensive repertoire of adverbial clauses and showed a greater capacity to fit movables within movables. For subject nominals, the high-ability group used noun clauses, infinitives, and verbal phrases, as well as the nouns and pronouns on which the low-ability group almost exclusively depended. As nominal complements, nouns and pronouns were used with about the same frequency by both groups, but the high-ability group invariably used more infinitives and clauses. In the low-ability group, boys clearly had more limited

syntactic repertoires than the girls; but in the high-ability group, the boys tended to excel.

5. Subjects most proficient in language characteristically made frequent use of conditional, hypothetical, and suppositional expressions that communicate tentativeness.
6. The subjects as a whole used adverbial and nominal clauses much more frequently than adjectival clauses; the high-ability group was more clearly distinguished by its frequent use of adverbial clauses than by its use of nominal or adjectival clauses. High-ability, low-ability, and randomly selected groups all showed increasing use of subordinate clauses as they advanced in chronological age, but the increase in this usage by the high-ability group was greatest and most consistent. Low-ability boys consistently used less subordination than did comparable girls, but high-ability boys exceeded comparable girls in use of subordination in four of the first seven years of the study. A subordination index devised by the investigator indicated that amount and complexity of subordination varied with socioeconomic status as well as with chronological age and general language proficiency.
7. "Transformational grammar, applied to two subjects, indicates that this kind of analysis is a valuable method of studying grammatical complexity."

The last quoted statement (Loban, 1963, p. 86) referred to a quite different sort of processing that Loban used to analyze language samples obtained from a boy of high ability and a girl of low ability when they were 8, 10, and 12 years old. On the basis of evidence derived from this transformational analysis, he concluded that the boy at 10 was handling English syntax with a proficiency that the girl did not attain even at age 12. "The method," he asserted, "holds promise for future research" (Loban, 1963, p. 63). No doubt, Loban did not mean to imply that promise is confined to the particular method he used. Though the intent of the developing theory of generative-transformational grammar, first outlined in some detail by Chomsky (1957), is said to be that of accounting for grammatical competence rather than performance, it is capable of suggesting several kinds of studies of language production. Some of the various possibilities have been explored in examinations of children's language.

Related Studies: Applications of Transformational Grammar

Without presuming to "explain" generative-transformational grammar (hereafter referred to simply as transformational grammar) something should be said here about its nature and about what studies based on its principles may reveal.

The announced (perhaps unachievable) goal of scholars engaged in working out the theory of transformational grammar is to formulate the most economical and coherent system of explicit rules adequate to characterize all the grammatically well-formed sentences possible in a particular language. Beginning with the abstract concept of "Sentence," the rules are expected to elucidate the concept by successively specifying operations of selection, ordering, and combination of syntactically functioning elements. (The sequence of elements at any stage of development is commonly called a "string," and the final arrangement prior to the actual production of a sentence is spoken of as the "terminal string.") Since some of the rules (described as recursive) allow particular operations, under identified appropriate conditions, to be endlessly repeated, the grammar gives a fairly simple account of processes that can lead to an infinite number of sentences. Some of the operations are optional; many are obligatory if a well-formed sentence is to result. Some of the operations produce a simple left-to-right development of a string; others effect transformations, which Chomsky (1957) demonstrated to be required to satisfy demands of economy and coherence in the system as well as to account for common intuitions of language users.

Transformation rules of three kinds must be differentiated. One type provides for the proper combination of elements that have been separately designated in a string and, perhaps, in an order not tolerated in actual language; for example, *past tense+verb* is converted to *verb+past tense* (if the verb chosen is *walk*, the result is *walked*). Another type of transformation rule was originally conceived (Chomsky, 1957) as an optional directive for converting into a different sentence type a terminal string that obligatory rules alone would make a simple, active, affirmative, declarative sentence, often called a kernel sentence. Rules of this kind were said to derive questions, negations, imperatives, passives, etc., from kernel strings; and the account of varied operations on a kernel string focused attention on the grammatical relationship between, for

example, such sentences as *He went there* (.) and *Who went there?, Where did he go?, Did he go there?, He didn't go there, did he?* The relatedness of sentence types through their transformational histories is still an important concern of transformational grammar, but the notions of how and where to incorporate rules that differentiate them have undergone considerable revision (see Chomsky, 1965).

Thirdly, there are transformational rules which designate operations affecting two underlying strings so as to join them or embed one in the other. The process is often called generalized transformation, but it is also referred to as sentence-combining transformation, because its effect is to produce one sentence where otherwise there would have been two. As a simple illustration, the formation developments that would finally produce the sentences

The man bought an automobile.
The man was poor.

may be so altered as to produce *The man bought an automobile, though he was poor* (.), or *The man who was poor bought an automobile* (.), or *The poor man bought an automobile* (.), etc. Of course, a similar process could also incorporate into these sentences the structure which would produce *The automobile was expensive.* The result could be such a statement as *The poor man bought an automobile which was expensive* (.) or *The poor man bought an expensive automobile.* For reasons that will be clear later, it is important to note that some rules for sentence-combining transformations require deletions in the embedded or conjoined structure (as in the third example above), others require substitutions (as in the second example), while others require expansions (as in the first example).

Such a system of rules as has here been imperfectly described should not be mistaken for an attempt to picture the sequential development of grammatical mastery experienced by language learners. Nor is it intended to account for all the observable facts of actual language production (which may be affected by fatigue, physical or neurological impairment, level of motivation, limitations of immediate memory, etc.). It is simply a logical organization (as yet incomplete) of statements meant to represent what users of a language must in some sense know in order to be able to produce and understand the possible sentences of the language, very few of which are duplicated in actual use. This is the meaning of the observation that the intent of transformational grammar is to account for competence rather than performance.

The theory and formulations of the grammar, however, suggest implications and important questions pertaining to the study of actual language use. They insistently imply that acquisition of language control is largely an outcome of mastering syntactic rules, the mastery by native speakers of a language being understood, of course, to be acquired unconsciously. Is there a common sequence of such learning? What degree of mastery is normal at a particular age? Do special circumstances affect development of mastery? Do relative complexities of different types of sentence development reflected in the rules of the grammar indicate relative difficulties that affect the production and comprehension of actual language expression? How do imitation and the well-known patterns of behavioral conditioning figure in the acquisition of control of grammar? Answers to such queries cannot be discovered by direct study of mental processes; they must come indirectly, from observations of language behavior. But results of these observations will depend on how they are made and what features of behavior they focus on. The concepts of transformational grammar point to particular aspects of language use that may be especially important to study, and they have generated some fresh modes of investigating them.

Leaving out of account some earlier studies of very young children, the first report of a transformational treatment of school children's language was made by Menyuk (1961). The language sample she worked with consisted of 9,583 "sentences" collected by mechanical recording in a variety of situations from forty-eight boys and girls in nursery school (mean age, 3:8) and from the same number of boys and girls in first grade (mean age, 6:5) in Brookline, Massachusetts. The sexes were approximately equally divided. Mean IQ scores were high and were closely comparable in the two groups. Menyuk identified both the simple and sentence-combining transformations reflected in the children's speech, and she noted the deviations from morphological and syntactic rules normally honored by speakers of standard English. Regarding those deviations as being produced by the rules of a children's grammar somewhat different from the grammar of adults, she set herself the problem of writing the children's grammar which would specify all the rules applied by her subjects of both grade levels.

Some of Menyuk's observations (1961; summarized in a later report, 1963b) are relevant to the questions explored in the present investigation. She found evidence of maturation in the fact that

though all the types of transformations identified in the speech of first grade children were used by at least a few of the nursery school children, some types were used significantly more often by first graders. The inverse was never true. (Increased volume of first grade language production may have partly accounted for the differences.) Two transformations used significantly more often in the first grade were of the simple type: the passive construction and the verb phrase with auxiliary *have*; three were sentence-combining transformations: subordination by *if*, subordination by *so*, and nominalization. Still, seven transformations found in the speech of both groups were yet used by "significantly less than 100 percent of first grade children" (Menyuk, 1963b, p. 414). No significant differentiations in use of transformations in either group could be made on the basis of IQ scores or sex. Transformed structures that did not fully follow the rules of adult grammar were found in the speech of children at both grade levels, but much oftener in that of nursery school children. Significantly more nursery school children failed to follow rules that in adult grammar are obligatory once a structure has been optionally chosen.

Menyuk (1963a, 1964a) has also described and discussed two later studies in the syntax of young children, including those in the earliest school years. The first was an investigation that went beyond an accounting of characteristics of freely produced speech to attempt the measurement of children's grammatical competence. Subjects were fourteen nursery school children and fifty kindergarten children of Brookline, Massachusetts, all of whose parents had middle class occupations. Mean ages of the two groups were 39 months and 66 months, and IQ's of both groups were above average. Three older subjects (a girl of nearly 7, a boy of 8½, and an adult male) also were used.

Having elicited from the sixty-four younger subjects a body of utterances produced under varying circumstances, Menyuk identified what appeared to be the rules that generated both the utterances that conformed to standard adult usage and those that deviated from such usage. She then tested the responses of both younger and older subjects when asked to repeat exactly the items in a set of sentences with a nine-word limit representing all the rules of phrase structure, transformation, and morphology she had identified as operative in the corpus—both those rules observed by adults and those restricted to the children's grammar. She also tested the ability of the older sub-

jects to correct deviant structures and to repeat each of the sentences representing the various transformations when the word order was exactly reversed.

Several important generalizations were derived from the experimentation. For none of the subjects, even those as young as three years, was the length of the sentence critical in determining success in repetition when produced word order was preserved; but when word order was reversed, there was a significant correlation between nonrepetition and length of the series of words, even for the adult. These facts were taken to indicate that the ability tested was dependent on mastery of grammatical structures rather than mere power to imitate.

As one might expect, the test also proved that, with the memory aid of immediate recall, the children "were better able to produce than to use in their own language both transformations and completely grammatical rules. . . ." (Menyuk, 1963a, p. 438). But the transformations not correctly repeated by a significant number of the subjects in the two younger groups may give a clue to the relative difficulty of constructions and may suggest something about the order in which control of syntactic features is acquired. Among nursery school children the number of correct repetitions did not attain the .05 level of significance for the question, the present-perfect verb phrase with participial *got*, the present-perfect verb phrase with adverb after the contracted auxiliary *have*, conjunction with *so*, conjunction with *because*, and nominalization; among kindergarten children only the *got* and *have* transformations were not properly repeated by a number of them large enough to be significant at the .05 level. Significantly more kindergarten than nursery school children repeated the question and the conjunction with *so*.

The third investigation reported by Menyuk (1964a) pursued the subject of young children's progressive acquisition of syntactic and morphological rules corresponding to those of standard adult grammar. Subjects were 159 children in Brookline, Massachusetts, ranging in age from 34 months to 85 months. They were of above-average intelligence, and their parents' occupations indicated upper middle class status. The investigator's collection and initial analysis of speech samples paralleled procedure in her earlier studies. Special processing of the data, however, allowed observation of patterns in the production of well-formed and of deviant structures.

One of those patterns identified in the corpus studied was a

general but markedly fluctuating decline, over the age range, in production of structures that (from the point of view of adult grammar) were not well formed. Rises in the proportion of ill-formed structures to well-formed ones of the same type coincided with rises in the number of children who appeared to be adding such a type to their repertory. Another pattern was the peaking of the relative frequency of types of deviant structures in a sequence that appeared to reflect progress from overgeneralization to appropriate differentiation. In phrase structure and morphology, peaks in omissions, substitutions, and redundancies appeared in that order, followed by a damping out of deviant structures. At the transformational level, certain rules were first overgeneralized in application but were later applied with proper discrimination. Menyuk concluded that "language acquisition and development cannot be explained as merely an imitative process since there are systematic levels of behavior in language production which cannot be accounted for by imitation of a model" (Menyuk, 1964a, p. 488).

Slobin (1963) reported a study of the behavior of subjects in kindergarten, Grades 2, 4, 6, and college when they were asked to evaluate various kinds of sentences or to retell stories that involved certain syntactic structures. Like investigators who have conducted similar experiments with adults, he found evidence to suggest that there is a rough (but not thoroughly systematic) correspondence between transformational complexity of sentences and difficulty in comprehending them.

Prior to the present study, the only reported application of transformational grammar to analysis of freely produced language of pupils in later school grades was that of Hunt (1964, 1965). He was concerned with writing samples of fifty-four students, eighteen each in Grades 4, 8, and 12 in Tallahassee, Florida. Subjects all had scores of 90-110 on the California Test of Mental Maturity. Boys and girls were evenly divided in each grade.

Hunt collected from each subject a thousand words of writing produced in the normal course of class work. Teachers were instructed not to make any changes in the writing which the subjects handed in. Hunt and his assistants marked for counting and subsequent exclusion from consideration what he called garbles (and Strickland and Loban had called mazes). The 54,000 word corpus was processed in a number of conventional ways, but the core of

Hunt's study dealt with the sentence-combining transformations found in the children's writing.

Before anything else, however, Hunt faced the problem of identifying the basic unit of expression whose objective measures are most meaningful and within which syntactic features could be most usefully studied. One of the impressive contributions of his report is the account of work on this problem.

He first regarded as "sentences" all passages set off as units in the students' writing by capital letters and periods or other terminal punctuation. Measuring the mean word-length of those units in compositions produced at the three grade levels, he found (as has every investigator who has compared large samples of writing produced under circumstances at all comparable) that the average lengths of those units were successively increased in compositions by successively older students. Considering the gaps between the grades represented in the study, however, the increments were not startling (about .6 of a word per year between Grade 4 and Grade 8, .25 of a word per year between Grade 8 and Grade 12), and the rate of increase dropped sharply in the older age span. More important is the fact that this index did not discriminate between individuals in the grade groups. Among the fifty-four students, the one whose sentences were longest (almost twice as long as those of the average twelfth grader) was a boy in the eighth grade. One fourth grader wrote sentences longer than those of any of the twelfth graders.

The conjecture might be offered that some children in lower grades may write more maturely than do those in advanced grades. Anyone familiar with children's writing, however, knows that there are more likely explanations: (1) younger students have not learned to punctuate accurately, and (2) they are excessively fond of coordinating main clauses—usually by the use of *and*. (The latter point may be put differently by saying that one sentence-combining transformation they learn early and tend to overuse is conjunctional coordination without deletion.) Hunt's inspection of individual papers showed that these explanations did indeed account for overlaps in "sentence" length among the three groups. In more general terms, too, he found frequencies of main-clause coordination to vary inversely with advances in grade level. The reports of both Strickland (1962) and Loban (1963), incidentally, had illustrated parallel phenomena in the speech of children. For this reason, meas-

urement of phonological units is not a satisfactory way of gauging linguistic maturity.

Hunt next considered the claims of clauses as units whose study may reveal significant differential linguistic behavior at successive age and grade levels. Those claims had been influentially advanced by LaBrant (1933), who observed that "it is impossible to determine what constitutes a sentence in an individual's oral or written composition, unless the sentence be perfectly punctuated by marks or intonation" (p. 482). LaBrant treated clauses as basic units in her study of the writing of twenty-one eminent psychologists and the compositions of 986 children in Grades 4 through 12. She computed the mean word-length of clauses, the ratio of subordinate clauses to the total number of clauses, and the relative frequencies of various clause types. Her view of the usefulness of such study has been shared by numerous investigators, and her general procedures have often been followed, though her mode of identifying clauses has been questioned and her conclusions based on subordination ratios have been attacked, particularly by Anderson (1937).

LaBrant (1933) counted clauses simply by observing predicating expressions; she tallied separately each member of a coordinated series of predicating verbs or verb phrases, even when the finite element of the verb phrase was omitted. It was on the basis of such a census of clauses that she was led to report (p. 460) "an insignificant variation in the number of words per clause" in compositions of children at different grade levels, while advances in age and grade were clearly reflected in higher subordination ratios. Hunt, however, cast serious doubt on the adequacy of LaBrant's methods when he showed that in the writing samples he studied there was an inverse relation between advances in grade level and frequencies of coordinated predications. The decrease in such coordinations was particularly striking when compositions of eighth and twelfth graders were compared; older students used only two thirds as many coordinated predicates as eighth graders did. In his further exploration, then, Hunt proceeded to apply the more normal definition of a clause (a structure composed of a grammatical subject and a predicate, either of which may contain coordinations).

So defined, clauses in the writing that Hunt analyzed were found to be significantly longer at each of the higher grade levels, though the rate of increase between Grade 8 and Grade 12

was only about one fourth of what it was between Grade 4 and Grade 8. There were also striking overlaps, particularly between children in Grades 8 and 12; fourteen of the eighth graders had written clauses longer than those of the student whose clauses were shortest in Grade 12.

Computation of subordination ratios on the basis of the more normal identification of clauses also revealed statistically significant differences between the grades. Once more, however, there was extensive overlapping among individuals in the various groups. Fourteen fourth graders had scores higher than the lowest score in Grade 8, and ten eighth graders outranked the lowest scoring student in Grade 12. Hunt (1964, p. 27) concluded that "the subordination ratio is not a very satisfactory index for individuals."

Finally, Hunt adopted the technique of segmenting student compositions into what he identified as minimal terminable syntactic units, to which he refers in abbreviated form as T-units. He describes these units (1965, p. 20) as consisting of "one main clause with all the subordinate clauses attached to it." The T-unit, then, is equivalent to a simple or complex sentence, but a compound sentence would be regarded as composed of two or more T-units. In effect, the T-unit appears to be equivalent to the "communication unit" employed by Loban (1961, 1963, 1965) in his study of children's speech.

Hunt found a steady, statistically significant increase in mean length of T-units from grade level to grade level, and inspection of individual ranges on this measure showed less overlapping among groups than on any of the other measures explored. He therefore concluded (1964, p. 31) that length of T-units is a better index of maturity in writing "than the subordination ratio, the length of clauses or the length of sentences." Statistical treatment of results of the four measures as reported by Hunt (1965, p. 23) confirmed his judgment that mean T-unit length was the best indicator of a student's grade level; the second best was shown to be mean length of clauses (as clauses are normally defined), while the poorest was sentence length.

It is obvious that the increased length of T-units with advances in age and grade is partly explained by increases in the use of dependent clauses within them. It should be remembered, however, that Hunt found significant increases in the mean lengths of clauses themselves; he also found that T-units containing no

subordinate clauses increased in length from grade level to grade level at about the same rate as did multi-clause T-units. He hypothesized that a very important factor in the progressive lengthening of T-units is an increase in the number of subclausal sentence-combining transformations embedded in them. Subsequent analyses justified that hypothesis. His investigation thus makes clear that the study of sentence-combining transformations in children's language, whether or not they produce subordinate clauses, may yield very useful information about development toward linguistic maturity.

The analyses to which Hunt subjected the corpus he studied were not confined to those relating to sentence-combining transformations, although they were his main concern. He applied to his material all the measures he was able to conceive as having possible use in describing the syntax employed by the subjects; the details of his important findings are too extensive to be reviewed here. He arrived at three general conclusions, however, which can be summarized as follows: (1) Almost all the syntactic structures identified for study in the corpus were used by the youngest writers. (2) Many of those structures were, nevertheless, used with significantly greater frequency by older students. The great majority of the structures used with such increased frequency were the ones produced by sentence-combining transformations. Older students tended to reduce to words and phrases much of what younger students would write as sentences. (3) Still, not all structures, not even all those resulting from sentence-combining transformations, showed increases in use with advances in age. "Consequently, this study can be said to have identified, to have isolated, some of what are apparently growth buds" (1964, p. 141).

It is the intent of the present investigation to pursue the search for growth buds within an age range generally lower but overlapping the one dealt with by Hunt. Here the search will also involve oral as well as written expression.

One of the common sources of uncertainty in the interpretation and comparison of reports that have been made on children's language is the diversity of conditions under which the language studied was produced. Many language collections, as, for example, those of McCarthy (1930), Day (1932), Davis (1937), Templin (1957), Strickland (1962), and Riling (1965), have been made by interviewers who attempted to stimulate free conversation, usually with the aid of books, toys, pictures, and other objects. The varied

possibilities of differential effects, in part generated by uncontrolled procedures of interviewers, are only too obvious. Loban (1963) reports unusual standardization of such interviews but indicates that his interviewers yet had liberties in behavior that could have affected responses. Aside from the conduct of interviewers (and quite possible differences in rapport established with different types of children), such collection of speech samples is likely to be affected by selection of the narrow range of stimulus objects. Davis (1937, p. 20) remarked on her own research that "no play objects or situation was discovered which was of equal interest to boys and girls of the ages studied. . . ."

An alternative method of collection, used by Menyuk (1961, 1963b, 1964a), Hocker (1963), and numerous earlier investigators, has been to record speech heard in a variety of situations, often when children are at free play. The advantages of this procedure of sampling are obvious, but operation of chance is also clear. What is often not clear is the appropriate weighting of evidences secured. Such shotgun technique may be used in securing writing samples; Hunt's collection of a thousand words written in three classrooms in response to uncontrolled assignments of the children's regular teachers is an example. Another is presented by Hoppes (1934), who studied 15,000 sentences written by Chicago school children on seven different (unspecified) topics.

Sometimes investigators (as for example, Stormzand and O'Shea, 1924) simply report data on writing produced by individuals at such and such grade levels, without supplying any information about where, when, or under what circumstances the sentences were produced. But a description of assignments does not always reassure an interpreter of the findings. The 12,000 sentences analyzed by Bear (1939) were produced following instructions to teachers in twenty-four St. Louis schools that they should have all children in Grades 1 through 8 write a paper on "an interesting experience during summer vacation." Results would certainly depend on numerous important variables, including summer experiences. Anderson (1937, p. 65), criticizing LaBrant's study based on writing done in response to two somewhat different assignments, formulated an assertion to which even casual observation leads: "Language is firmly related to the situation or circumstances in which it is produced . . . and to the subject matter it is concerned with."

There is, of course, no perfect solution to the problem of

language sampling, particularly over a wide age range. Heider and Heider (1940), however, hit upon a promising scheme. They asked all their subjects (aged 8 to 14) to write compositions based on a short moving picture they had been shown. This procedure has the disadvantage of restricting the stimulus situation, though an appropriately chosen movie would seem to be more richly suggestive than a set of toys or still pictures. The method has the advantages of clearly defining the restrictions of the situation, of minimizing psychological effects of interaction between investigator and subject, and of uniformity of stimuli to which all the children are expected to respond. By such means, also, responses of sufficient length to be significant may be obtained. The procedure initiated by Heider and Heider was adapted by Harrell (1957) in his investigation of the relation between oral and written language expression of school age children. With other adaptations, it is the method used in the present study.

Limitations and Assumptions

The study reported here deals only with objectively identifiable characteristics of children's speech and writing. It does not evaluate word choice, organization of discourse, or rhetorical effectiveness. It has been concerned with neither accuracy of spelling and punctuation, characteristics of pronunciation and prosody in speech, nor departures from adult norms in inflectional forms. Attention has been focused almost wholly on syntactic units and their constituents. Even in reporting on those units, the authors make no claim to completeness of description, for the possible range of syntactic features that might be observed is unmanageably wide. Our main interest has been in grammatical transformations employed by the subjects, though some other aspects of their syntax (incidence of main clause types, for example) have been observed. It should be emphasized, too, that we did not study all transformations that could be identified in the language samples, but only those regarded as sentence-combining.

Though we have avoided ordinary kinds of subjective judgments on quality of speech and writing, it must be said, however, that we have operated on certain assumptions about evidences of relative maturity. Admittedly, those assumptions are based in part on loosely defined notions about adult standards of language use, and hence, about what constitutes development (or the opposite)

in children's syntax. It was supposed, for example, that when nearly 10 percent of the children's main clauses were grammatically incomplete, their practice was far out of line with that of adults. Consequently, it was supposed that reduction (though not necessarily elimination) of incomplete clauses would be an aspect of development toward maturity. Again, it was supposed that, even in narration, the introduction of more than half the main clauses with coordinating conjunctions is a wide divergence from the behavior of educated adults; increases in the amount of such coordination could hardly be viewed as development of syntactic skill.

Group increases in uses of certain other types of syntactic structures, however, were regarded as manifestations of growing control of syntactic resources. Employment of a wider range of structures implies flexibility, and consequently increased control of the instrument of language. Most of the types of structure identified for attention also have the effect of tightening up expression. Since sentence-combining transformations usually augment the information-load of syntactic units, it appears reasonable to suppose that, within limits surely not often reached by children, their increased incidence in extensive samples normally reflects linguistic growth. Obviously, the same thing could not be confidently said of a particular, brief expression.

Interpretation of what constitutes evidence of development is also based on observed behavior of the children studied. It was presumed that marked and continuing increases in incidence of syntactic structures not common in kindergarten (or in writing in Grade 3) was an indication of growth toward maturity, though fluctuating variations in rate might be due to special, unidentified factors. Similarly, marked, sustained decrements were taken as probably reflecting rejection of immature habits. These evaluations appear justified because the subject and purpose of all discourses were the same, and conditions under which the children responded were as nearly alike as possible. Differences in language use, therefore, cannot be explained as being called for by differences in the functions being performed by language.

It must be constantly remembered, of course, that the language production analyzed was mainly narrative in character, though each child had some opportunity to make explanations and defenses of expressed opinions. The language samples do not necessarily show what the children would have done under other types of

stimulus conditions. Nor do they give much basis for speculating about so-called "passive abilities"—abilities to understand in listening or reading. They simply show how children at various stages of their development did express themselves in a particular kind of situation.

CHAPTER II

RESEARCH DESIGN AND PROCEDURES

Broadly stated, the purpose of this study was to discover what might be learned about language behavior, especially about use of syntactic units and structures, from a particular series of analyses applied to comparable samples of speech and writing of boys and girls at various stages of development from kindergarten age through the seventh grade.

The Subjects of the Study

All subjects in this investigation were pupils in the Mitchell-Neilson School in Murfreesboro, Tennessee, or were children who expected to enter that school in the fall of 1965. They consisted of thirty children enrolled in private kindergartens and thirty pupils each from the first, second, third, fifth, and seventh grades. The speech and writing samples were obtained in March, 1965; hence, the children were about to complete the school year. Selection of subjects was controlled only so as to assure that there would be approximately the same number of boys and girls in each grade group. Since data dealt with in the study are almost invariably reported proportionally, small differences in sizes of sex groups in four grades should not affect interpretations; in one instance (the Table 5 report on total occurrences of garbles) those differences must be taken into account. The exact distribution of sexes is shown in Table 1.

TABLE 1—Distribution of Sexes in Grade-Level Groups of Subjects

		Grade				
Sex	*Kindergarten*	*1*	*2*	*3*	*5*	*7*
Boys	15	15	14	14	16	17
Girls	15	15	16	16	14	13

Age ranges within the groups were quite wide. Presumably, age variations within the grades reflect teachers' promotional policies based on judgments of pupils' stages of development. If that is true, those variations may enhance rather than cast doubt on generalizations to be made about sequential developments in language production. On the other hand, the close correspondence of mean ages of boys and girls in the several groups assures comparability of

the findings relating to sex, except in Grade 7. The details of age ranges and means may be seen in Table 2.

TABLE 2—Age Ranges and Mean Age in Years and Months for Boys and Girls at Six Grade Levels Studied in This Investigation

	Grade					
	Kinder-garten	*1*	*2*	*3*	*5*	*7*
Boys						
Age Range	5:4-6:4	6:3-7:4	7:5-9:3	7:8-10:2	10:2-11:8	12:5-14.6
Mean Age	5:10	6:7	7:11	8:9	10:10	13:3
Girls						
Age Range	5:3-6:2	6:3-7:2	7:2-8:4	7:4-9:9	10:5-11:2	12:2-13:2
Mean Age	5:10	6:9	7:10	8:8	10:10	12.8

Note: Month numbers are separated by a colon from year numbers.

Lorge-Thorndike tests of intelligence had been administered to most of the subjects in the third, fifth, and seventh grades. The DIQ range from 81 to 143 seems to confirm the explanation of age variations within grades that was proposed above. Mean scores, however, indicate that the grade groups as wholes were average in intelligence. They also show the groups and subgroups to be generally comparable, but two pertinent observations on this point should be made. First, DIQ scores for fifth graders are somewhat lower than those for either of the other groups; this fact may give special interest to the observation of linguistic advances in Grade 5, particularly in writing. Second, DIQ mean scores for girls in the seventh grade exceed those for boys in that grade by nearly ten points; in light of this fact the very favorable findings relating to performance of boys in the seventh grade should be the more impressive. Lorge-Thorndike mean scores and standard deviations are reported for sex and grade in Table 3.

TABLE 3—Lorge-Thorndike DIQ Score Means and Standard Deviations of Boys and Girls at Three Grade Levels*

	Grade 3		*Grade 5*		*Grade 7*	
	Mean	SD	Mean	SD	Mean	SD
Boys	111.1	13.3	102.5	11.7	104.6	16.5
Girls	113.3	9.3	103.6	13.2	114.8	16.5

*Test forms used were Form A Nonverbal in Grade 3, Form A Verbal in Grade 5, and Form B Verbal in Grade 7.

TABLE 4—Metropolitan Achievement Tests: Word Knowledge and Reading, Mean Raw Scores and Standard Deviations of Boys and Girls at Five Grade Levels

	Grade 1		*Grade 2*		*Grade 3*		*Grade 5*		*Grade 7*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Word Knowledge										
Boys	25.87	4.85	24.29	7.04	31.00	11.56	35.07	9.75	33.59	8.47
Girls	28.87	8.60	27.69	5.22	34.69	9.53	34.38	12.14	33.38	9.43
Reading										
Boys	26.60	7.78	33.36	10.18	27.50	9.05	27.21	7.79	23.76	9.71
Girls	35.00	12.18	38.81	11.45	30.81	6.67	28.31	8.96	28.61	9.28

As a further gauge of relevant characteristics of the subjects enrolled in school, a tabulation was made of their scores on the language section of the Metropolitan Achievement Test, which all except the seventh graders took in April, 1965. Seventh grade scores were derived from tests given in September, 1965; this will account in part for their being lower than might be expected. Mean scores and standard deviations for boys and girls in the various grades are displayed in Table 4. Once more, there is evidence of considerable variation within the groups, but only at one point is there a striking difference in the scores of boys and girls. The reading scores make it appear that there were some distinctly superior girls in Grade 1.

No detailed data have been collected on the education and occupation of parents of the subjects, but one reason for choosing to study pupils at the Mitchell-Neilson School was that it serves a homogeneous neighborhood. Its patrons are uniformly white middle class families.

Collection of the Language Samples

The language samples on which this study is based consist of childrens oral and written responses to two short movie films selected from the Coronet Language Arts series. The films presented animated cartoons of two of Aesop's fables. "The Ant and the Dove" and "The North Wind and the Sun." Each film is eight minutes in length. Each was shown with the sound turned off, so that the narrator's language would not influence that elicited from the children.

The films were viewed by three children at a time. Immediately after seeing a film, each child was asked to tell the story of it privately to an interviewer and to answer certain preplanned questions related to the narrative. The children's oral responses were recorded on tape; third, fifth, and seventh graders were then asked to write the story of the film and answers to the same questions. The questions were included for the purpose of securing a sample of discourse other than simple narrative.

All the interviewers were local housewives who had had experience as teachers in elementary classrooms. In order to assure comparability of the language samples, interviewers were given a schedule of instructions and were asked to follow them without deviation. The schedule of instructions constitutes Appendix A in this report.

Typescripts were made of each child's oral and written responses. Transcriptions of written compositions copied exactly the children's punctuation, capitalization, and spelling. Those of oral expression were not punctuated; they were carefully checked to make sure they accurately represented what the child had said, including all contractions, audible pauses, false starts, redundancies, and the like. In these typescripts, if responses to questions consisted of a single word or merely an article and a noun, they were bracketed for exclusion from further attention, since they would be trivial items in the syntactic analysis. Examples of typescripts at this stage of processing may be found in Appendix B at the end of this report.

Analysis of the Language Samples

Before records of the children's speech and writing were processed any further, elements in them regarded as syntactically irrelevant were marked (in red ink) for special treatment. In the speech transcripts, representations of audible pauses (usually recorded as *uh*) were thus eliminated from all computations. False starts, redundant subjects (such as *he* in *the ant he went home*), and word-tangles as well as noncommunicative repetitions (called "mazes" on analysis worksheets—see Appendix C) were excluded from subsequent study of syntax, but they were tabulated for reporting as "garbles."

With garbles and representations of audible pauses eliminated, a word count of each individual set of responses was made. Conventional word division as represented in dictionary entries was generally honored, but two special rules were adopted to make the count more uniform and meaningful. Contractions such as *he'd* and *isn't* were regarded as two words, and compound nouns (whether written solid or hyphenated in dictionaries) were given the count indicated by the number of bases involved. Thus "snowball" would be counted as two words. The same principles were applied in later word counts.

The language samples were next segmented into minimal terminable syntactic units (T-units), which were to be the subject of special study and the bases for most of the detailed analyses undertaken. This is the unit that Hunt (1964, 1965) found particularly useful in the study of children's writing. As explained in Chapter I, the T-unit is a single independent predication together with any subordinate clauses that may be grammatically related to it. It may be a simple or a complex sentence, but not a compound sentence.

The practice of English writers has always allowed initiation of a sentence with a coordinating conjunction; in identifying T-units, then, a coordinating conjunction linking two independent clauses was regarded as the first element in the second clause.

Hunt (1964, p. 35) has pointed out that, though the segmenting of a piece of writing into T-units often requires disregarding the writer's punctuation, the definition of such units is so clear and their identification depends on grammatical principles so generally understood that a competent analyst's judgments ought to be highly reliable. His assertion is validated by the fact that investigators conducting the present study found themselves in complete agreement on the boundaries of T-units in a large sample of transcriptions on which they worked independently. This was true of transcriptions of tape recorded speech as well as of typescripts of children's writing. It is quite possible, of course, that the interscorer agreement is partially explained by the fact that the investigators were familiar with the content of the films about which the children wrote and spoke; hence, semantic clues could reinforce structural clues in the rare instances of potential ambiguity. Listening to tape recordings and noting features of pitch, stress, and juncture after segmentation of transcriptions had been made gave no ground for altering the identification of T-units.

The number of T-units was counted in each sample of speech and writing, and the number of words in each sample was also obtained (excluding garbles). For comparison with findings of Hunt (1964, 1965), the proportionate frequencies of T-units less than nine words in length were computed. Other measures of differential language behavior, and ones that turned out to be very revealing, were secured by calculating the mean number of words per T-unit and the mean number of sentence-combining transformations per T-unit.

After T-units had been identified, each one was typed on an analysis sheet and was submitted to detailed study. First, the sequential pattern of the main clause was described (whether it consisted of subject+main verb, subject+main verb+direct object, adverb+main verb+subject, etc.). Its rhetorical type (whether statement, question, etc.) was also noted, though this information appears to have no pertinence to the study and is therefore not reported among the findings. Most important was the identification of the number, kinds, and functions of sentence-combining transformations

the T-units contained. Examples of processed analysis sheets may be seen in Appendix C.

The nature of sentence-combining transformations and the rationale for concentrating attention on them have been explained in Chapter I. Here it is necessary only to outline the method of dealing with them in this study.

One type of sentence-combining transformation, of course, is that which joins independent predications by use of coordinating conjunctions. That type, for reasons also explained in Chapter I, was excluded from consideration by the decision to segment the material into T-units. An accounting, however, was made of coordinating conjunctions that introduced T-units. All other sentence-combining transformations were classified under three heads: (1) those producing nominal constructions, (2) those producing adverbial constructions, and (3) those producing coordinate constructions within T-units.

One reason no category was assigned to adjectival constituents of sentences is that those produced by transformations are usually parts of nominal constructions. Neither simple predicate adjectives nor those modified by intensifiers would figure in a transformational analysis. When elements such as clauses or infinitives modified (or, as some would say, complemented) adjectives, they were classed as adverbials; total constructions headed by the adjectives were not accounted for in this study. Coordinated adjectives, whether in the subject complement position or elsewhere in the sentence, were naturally tabulated as structures of coordination. Coordinate constructions, of course, may also join not only predicates but nominals and adverbials.

Subdivisions of the three major categories were identified according to types of structure and function, and each sentence-combining operation was tabulated in the appropriate subcategory. A few constructions formed by combining sentences could not be labeled by reference to published descriptions of transformational grammar. Since these were characteristically movable elements not closely related to a single constituent, they were classified as sentence adverbials. Compound nouns were treated as structures produced by transformation. The investigators followed Roberts (1964) in identifying determiners and predeterminers, and no attempt was made to analyze these elements.

Much of the grammatical analysis was performed by trained

graduate assistants, but all profiles of T-units were verified by the principal investigator.

Processing of the Data

In this report, the only raw data offered relate to garbles. All other numerical accounts of observed features of speech and writing are reported in terms of group means or rates of occurrence per 100 T-units.

The greater part of the computation involved in the study was performed by means of an IBM 7072 electronic data processing system. Statistical analysis of variance was executed to test for significance at the .05 level the mean differences in frequency of uses of grammatical structures by boys and girls at various grade levels and in both modes of expression (speech and writing). The procedures used for testing statistical significance were those described by Lindquist (1953, pp. 207-214, 281-284). Appropriate subanalyses were conducted where necessary to clarify the nature of the more complex relationships.

Two distinct types of research design were used, because samples of writing were not obtained from the three youngest groups of children. The first design, diagramed in Figure 1, permitted comparisons of performance of boys and girls in oral language production at six grade levels. The second, diagramed in Figure 2, was a three-dimensional design that added the factor of comparisons between oral and written expression of subgroups in Grades 3, 5, and 7.

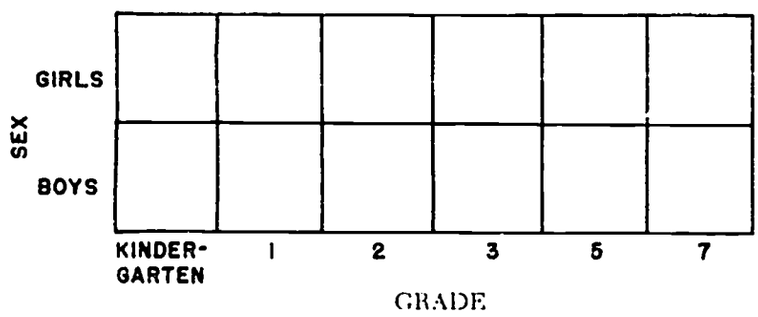

Figure 1. Research design used in studying sex and grade level differences in oral language production.

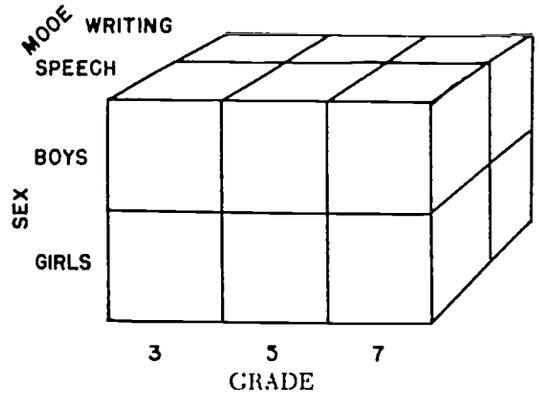

Figure 2. Research design used in studying oral and written language production of boys and girls at three grade levels.

CHAPTER III

FINDINGS AND INFERENCES

The principal intent in this study was to analyze the use of particular syntactic structures in children's language in ways suggested by transformational grammar, but certain other aspects of the language samples have also been observed and will be reported. Findings will be detailed and discussed under six general headings:

1) Garbles: false starts, abnormal redundancies, and word-tangles.
2) Length of total responses, excluding extraneous matter.
3) Length of minimal terminable syntactic units (T-units).
4) Number of sentence-combining transformations in T-units.
5) Kinds and functions of sentence-combining transformations.
6) Structural patterns of main clauses.

Garbles: False Starts, Abnormal Redundancies, and Word-tangles

"Garbles" is a term used here to refer to about the same phenomena it covers in Hunt's reports (1964, p. 11; 1965, p. 6) on children's writing. The account of garbles in this study is not closely comparable to the report of "mazes" in children's speech made by Strickland (1962) or to that of Riling (1965), who carefully followed Strickland's methods. Strickland included as mazes not only audible pauses but what she called "holders" (examples: "Well," "now," "you see"). The latter were in this investigation identified (but not reported separately) as "attention claimers"; they were not considered syntactically extraneous, so they figure in word counts of total responses and T-unit length. Loban's explanation (1963, pp. 8-9) of what he calls mazes suggests greater similarity to garbles as they are conceived here.

Distribution of garbles in grade groups and subgroups is shown in Table 5, with individual ranges of occurrence in speech and writing. It is important that in almost every subgroup most garbles are attributable to a few individuals. Hunt (1964, 1965) reported such a phenomenon in the compositions he studied.

The data in Table 5 should be compared with the account of mean word-length of total responses, excluding extraneous matter,

presented in Table 6. With or without such a comparison, it may be seen that in oral language, garbles were very common in all grades; that a decline in occurrences in Grade 1 was followed by a rise in Grade 2; and that moderate decreases took place in Grades 3 and 5. Consideration of total amounts of speech production makes the latter decreases appear more impressive and shows a relative decline also in Grade 7. In writing, where garbles were fairly rare, raw data on occurrences are quite misleading. Relative to total length of written compositions, fifth graders produced garbles only about two thirds as often, and seventh graders three fourths as often, as third graders did. Further computation, taking length of responses into account, shows garbles were produced seven times as often in speech as in writing by seventh graders, nearly nine times as often by fifth graders, and a little more than nine times as often by third graders. Similar calculations show that the rate of occurrence was about the same for boys and girls in kindergarten, but that girls produced garbles somewhat more frequently than boys did in Grade 1. Discrepancies in the numbers of boys and girls in the other four grades make accurate comparisons impossible, but the data do not appear to indicate any consistent pattern of sex differences.

Garbles in speech and in writing have been associated in this discussion for convenience, without implication that the same factors operate to produce them in the two modes of expression. Distinct differences in causation were probably reflected in large discrepancies between numbers of garbles in oral and written language and in the fact that children producing them most frequently in speech were seldom those in whose writing they most often appeared.

The wide divergences in individual performance reported here make it hazardous to generalize about typical behavior of age groups. It is true that in both speech and writing, children in the lowest grades sampled indulged in garbles with relatively greatest frequency; yet group records of the older children show neither consistent nor dramatic progress in eliminating them. The relation between freedom from garbles and other aspects of children's language control might be clarified by special study of the expression of individuals. The importance of investigating this subject is suggested by the observation of Riling (1965) that fluency seemed an unreliable index of maturity in the use of language by children she studied.

TABLE 5—Total Occurrences of Garbles and Individual Ranges in Their Production in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels

	Kindergarten Total	Range	*Grade 1* Total	Range	*Grade 2* Total	Range	*Grade 3* Total	Range	*Grade 5* Total	Range	*Grade 7* Total	Range
Speech												
Boys	177	3-23	114	0-25	256	1-52	221	3-43	188	4-25	172	0-40
Girls	163	3-40	149	0-26	229	3-34	183	2-37	135	1-22	161	3-29
Both	340	3-40	263	0-26	485	1-52	404	2-43	323	1-25	333	0-40
Writing												
Boys							5	0-1	16	0-4	26	0-8
Girls							14	0-3	6	0-1	8	0-2
Both							19	0-3	22	0-4	34	0-8

Length of Total Responses, Excluding Extraneous Matter

Mean numbers of words in total responses, exclusive of audible pauses and other extraneous matter categorized as garbles, are presented in Table 6. Not unexpectedly, there was a steady increase in length of responses through all the grade levels studied. Investigations of speech elicited in similar stimulus situations from groups of preschool children have repeatedly shown increasing volubility to be a usual accompaniment of advancing age (see McCarthy, 1954), and a number of reports on language behavior of older children have said the same thing. Harrell (1957, p. 63), for example, observed of both oral and written compositions he obtained from children aged 9, 11, 13, and 15, that the "average lengths of stories showed a consistent gain with increasing age." The confirmatory findings of the present study indicate that when either oral or written responses are elicited under closely comparable conditions from a large number of normal children at varying grade levels, one may confidently predict (within each mode of expression) a high positive correlation between advances in grade and gross increases in wordage.

A glance at Table 6, however, will show that increases in length of total responses do not necessarily occur in the same proportions from stage to stage. In the oral samples studied, the amounts of speech increased least from kindergarten to the end of Grade 1 and from the end of Grade 5 to the end of Grade 7; in writing, there was a notably smaller increment between the fifth and seventh grades than between the third and the fifth. That total wordage is defective as a measure of development in linguistic maturity is indicated by the fact that, as will be shown later, almost all of the evidences of syntactic control identified in this study prove the first graders and seventh graders to have made the most impressive advances in oral expression. On a number of counts, it is also true that fifth graders made more notable gains in writing than did seventh graders.

Again not unexpectedly, we find that written responses were shorter than oral responses in each of the grades from which writing samples were obtained. It is a common observation that children speak more volubly than they write; this would be particularly true of third grade children, who have not generally acquired much facility in writing. Evidence to be detailed later shows, however, that children in the upper grades made strikingly greater use of numerous syntactic resources in writing than in oral expression. It is quite pos-

TABLE 6—Means and Individual Ranges in Word-Length of Total Responses in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels

	Kindergarten		*Grade 1*		*Grade 2*	
	Mean	Range	Mean	Range	Mean	Range
Speech						
Boys	230.5	103-437	248.8	63-508	370.9	163-842
Girls	188.3	82-442	241.5	46-445	334.3	206-669
Both	209.4	82-442	245.1	46-508	352.6	163-842
Writing						
Boys						
Girls						
Both						

	Grade 3		*Grade 5*		*Grade 7*	
	Mean	Range	Mean	Range	Mean	Range
Speech						
Boys	556.9	210-1028	643.6	390-1016	870.2	330-2101
Girls	469.6	258-636	670.1	254-1160	655.1	380-1007
Both	510.3	210-1028	656.0	254-1160	748.0	330-2101
Writing						
Boys	210.9	93-408	366.1	241-572	561.2	262-1489
Girls	238.6	115-372	411.9	237-861	504.4	351-797
Both	225.6	93-408	387.5	237-861	536.6	262-1489

sible that fifth and seventh graders wrote compositions shorter than their oral discourses because they packed more information into written units. Seventh grade written compositions were approximately equal in length to third grade oral responses.

Since these children did the writing after they had retold and discussed the story they had seen enacted, one might propose that fading memory of the film had something to do with the relative brevity of written compositions. It could as easily be argued, however, that oral review of the content of the film should act as a primer and stimulus for writing. Pertinent here is the fact that Harrell (1957) reported longer oral than written compositions from children in each of the four grade groups he worked with, though the oral and written responses were made to two different films and each type of response was recorded immediately after the viewing.

Because of the widespread notion that girls are generally more voluble and facile in linguistic expression than boys are at comparable ages, it is noteworthy that in the language samples described here, oral responses of boys were longer than those of girls at every level except Grade 5. Boys in the seventh grade (where, it is true, their mean age was somewhat greater than that of the girls) also wrote longer compositions. Girls in Grades 3 and 5, however, exceeded the boys in relative amounts of writing they produced. Since the stimulus conditions under which Harrell (1957) elicited responses were so similar to those in which language samples for this study were obtained, it is interesting to note that he found boys aged 11, 13, and 15 produced oral compositions longer than those of girls at the same ages. He also reported that girls wrote more than boys did at each of the four age levels he studied, but the differences were statistically significant only at ages 9 and 11. Perhaps, in our culture, girls in the middle grades more rapidly adapt themselves to writing than boys do.

Length of Minimal Terminable Syntactic Units

Findings in this study support the conclusion by Hunt (1964, 1965) that the mean length of minimal terminable syntactic units (hereafter consistently referred to as T-units) is a sensitive measure of development toward maturity in children's language production. Without exception for any subgroup at any stage, data obtained showed increments in T-unit length from grade to grade. The increases varied in magnitude, but they varied concomitantly with other features of expression that may be taken to reflect develop-

TABLE 7—Mean Numbers and Individual Ranges in Mean Numbers of Words per T-unit in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels

	Kindergarten		*Grade 1*		*Grade 2*		*Grade 3*		*Grade 5*		*Grade 7*	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Speech												
Boys	7.47	6.2-9.5	7.97	5.2-9.5	8.52	6.3-9.8	8.79	7.4-10.8	8.85	7.7-11.5	10.21	8.6-11.6
Girls	6.66	4.0-9.2	7.96	5.5-10.1	8.15	6.6-9.7	8.67	7.7-10.0	8.95	7.6-11.2	9.39	8.1-12.7
Both	7.07	4.0-9.5	7.97	5.2-10.1	8.33	6.3-9.8	8.73	7.4-10.8	8.90	7.6-11.5	9.80	8.1-12.7
Writing												
Boys							7.48	5.7-11.6	9.23	7.1-11.6	10.28	7.8-13.8
Girls							7.86	6.2-8.8	9.45	7.6-11.9	9.69	8.0-13.4
Both							7.67	5.7-11.6	9.34	7.1-11.9	9.99	7.8-13.8

ment of syntactic control. In speech there were statistically significant increases in T-unit length from the kindergarten stage to the end of Grade 1 and from the end of Grade 5 to the end of Grade 7; in writing, a significant increase came in Grade 5. These are precisely the times at which further analysis showed particularly remarkable syntactic developments in the two modes of expression.

It is noteworthy that in Grade 3, T-units were longer in oral than in written expression, but in Grades 5 and 7 they were longer in writing. In none of these grades were differences in T-unit length in speech and writing statistically significant, but the data suggest that as children progress through the upper grades they learn to control their writing more strictly than their speech. This suggestion is reinforced by other evidence to be adduced later.

In speech, the T-units used by boys were slightly longer than those used by girls at all stages except Grade 5; in writing, those used by girls were longer than those used by boys in Grades 3 and 5, but not in Grade 7. None of these differences is statistically significant.

Since Loban (1964), reporting on speech of elementary school children in Oakland, California, and Hunt (1964), studying writing of children in Grades 4, 8, and 12 in Tallahassee, Florida, measured the word-length of units comparable to those here reported from speech and writing of children in Murfreesboro, Tennessee, it may be useful to compare grade level data from the three investigations. Comparisons are graphically presented in Figures 3 and 4. In interpreting these graphs, it should be remembered that the Oakland study followed the same children through a sequence of grades, while the other studies were horizontal in nature.

It will be noted that the trends described in the three studies are generally parallel. Special attention should be called to the similar advances in the first grade in Oakland and Murfreesboro, with subsequent similar reductions in rate of advance in Grades 2 and 3. Acceleration in rate of lengthening oral T-units between Grades 5 and 7 in Murfreesboro may be compared with the even greater acceleration between Grades 6 and 8 in Oakland. The initial and continuing spread between means of unit length in Oakland and Murfreesboro may possibly be explained by differences in stimulus situations or by the inclusion of a large number of disadvantaged children among Loban's subjects.

The comparison of T-units in samples of writing of children in

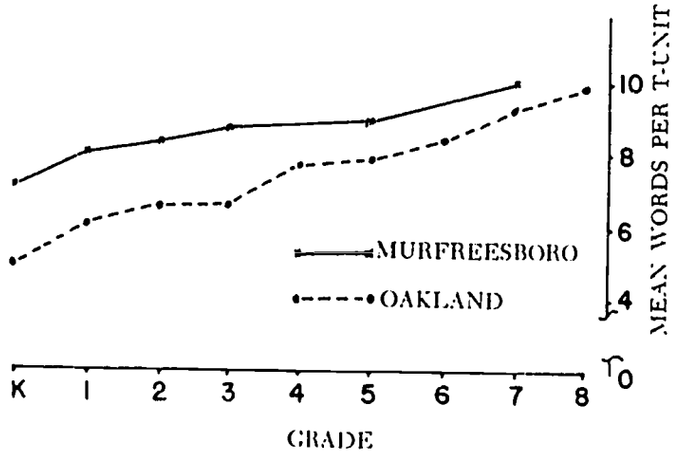

Figure 3. Mean number of words in T-units in oral discourse of children in Murfreesboro, Tennessee, and Oakland, California. (Ref.: Loban, 1964, p. 57.)

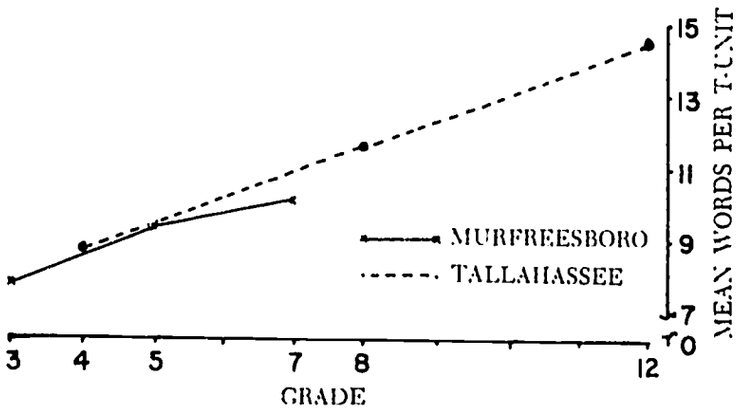

Figure 4. Mean number of words in T-units in written material produced by children in Tallahassee, Florida, and Murfreesboro, Tennessee. (Ref.: Hunt, 1965, p. 22.)

Murfreesboro and Tallahassee is remarkable for the almost exact correspondence of data for the earlier grades.

Hunt observed (1964, pp. 40-48) that a striking difference be-

tween the writing of younger and older students was to be seen in the proportions of very short T-units in their respective compositions. By comparison to the frequency of T-units less than nine words long in the writing of twelfth graders, he found the frequency of such units in compositions of eighth graders more than twice as great, while in those of fourth graders it was almost four and a half times as great. In order to compare characteristics of the writing of children in Murfreesboro with those in writing by children in Tallahassee, and to observe the same features in oral expression at various age levels, Table 8 was prepared. It shows the percentages of short T-units in subsamples of the corpus here reported on.

TABLE 8—Percentages of T-units Less Than Nine Words Long in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Speech						
Boys	72.91	68.96	61.88	61.06	60.78	51.11
Girls	77.43	65.76	66.56	59.56	60.79	57.33
Both	75.17	67.36	64.22	60.31	60.78	54.22
Writing						
Boys				71.65	52.02	44.93
Girls				67.69	51.49	50.08
Both				69.67	51.75	47.50

The contrasts here are not as sharp as those observed by Hunt (see Figure 5), but except in the speech of fifth graders, there was a steady decrease in the proportion of short T-units in both modes of expression. Most remarkable, however, is the fact that the proportion in third grade writing was higher than in first grade speech, yet the decrease in fifth grade writing was more marked than decreases in speech in any four-year time span. These facts are consistent with a number of others indicating that syntactic control of third graders was much weaker in writing than in speech, but that in the upper grades there was a reversal of relative mastery in the two modes of expression.

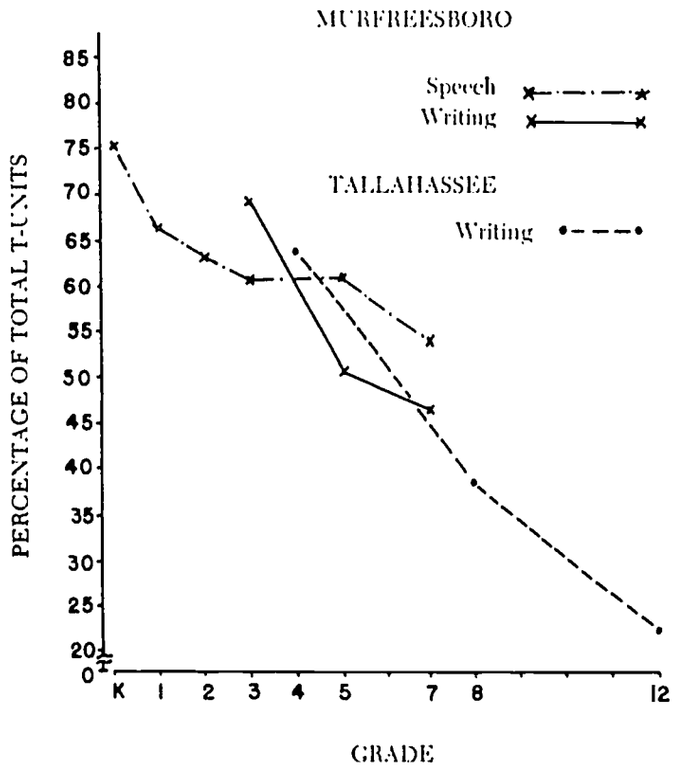

Figure 5. Percentages of T-units less than 9 words in length in writing of children in Tallahassee, Florida, and in speech and writing of children in Murfreesboro, Tennessee. (Ref.: Hunt, 1965, p. 30.)

Number of Sentence-Combining Transformations per T-unit

Except for coordinations of main clauses, sentence-combining transformations may be conceived as embedding one kernel sentence (often, though not always, in reduced form) into another in ways determined by the rules of grammar. This embedding increases the information carrying power of the resulting construction. It may well be supposed, then, that at least for children, the relative density of these transformations within T-units signalizes the degree of maturity attained. (In adult expression, of course, this density may reach a point of diminishing communicative effectiveness, beyond which it indicates something other than linguistic mastery.)

Naturally, the embedding process described will also lengthen T-units, so there should be a correlation between unit length and the incidence of sentence-combining transformations. A comparison of Table 7 with Table 9 does indeed show a positive relationship. Table 9 accounts for the proportional number of all sentence-combining transformations except main-clause coordination.

Just as length of T-units was increased in each successive grade, so increments in the number of sentence-combining transformations appeared in each mode of expression in all grades. (They also occurred in all subsamples at successive levels, except in oral expression of boys in Grade 5.) These increments were greatest in exactly the time spans when the T-units were most notably lengthened. In speech, the increases in Grade 1 and in Grade 7 were statistically significant. In the writing samples, significant increases occurred in both the fifth and the seventh grade.

Inspection of Tables 7 and 9 will show, however, that the correlation between increases in length of T-units and number of transformations per T-unit was not perfect; this fact is graphically demonstrated in Figure 6. One obvious reason for imperfect correspondence is that there are other ways of lengthening T-units besides embedding other sentences in them. Probably more important is the fact that different types of sentence-combining transformations produce syntactic structures widely varying in degree of complexity—from a single noun adjunct to a relative or adverbial clause.

Still, the parallels in these two measures are impressive. Just as third graders, for example, used longer T-units in speech than in writing, while fifth graders reversed that relationship, so there were more sentence-combining transformations in oral than in written T-units of third graders but more in the written than in the oral T-

TABLE 9—Mean Numbers and Individual Ranges in Mean Numbers of Sentence-Combining Transformations per T-unit, Excluding Coordination of Main Clauses, in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels

	Kindergarten		*Grade 1*		*Grade 2*		*Grade 3*		*Grade 5*		*Grade 7*	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Speech												
Boys	.81	.4-1.6	.97	.3-1.6	1.01	.5-1.2	1.03	.7-1.4	1.03	.7-1.7	1.47	1.0-1.8
Girls	.62	.0-1.3	.92	.2-1.6	.94	.4-1.6	1.00	.7-1.5	1.07	.6-1.6	1.21	.7-2.1
Both	.71	.0-1.6	.95	.2-1.6	.97	.4-1.6	1.01	.7-1.5	1.05	.6-1.7	1.34	.7-2.1
Writing												
Boys							.82	.3-1.7	1.36	.7-1.9	1.70	1.0-2.5
Girls							1.02	.4-1.5	1.45	.8-2.5	1.51	.9-2.7
Both							.92	.3-1.7	1.41	.7-2.5	1.61	.9-2.7

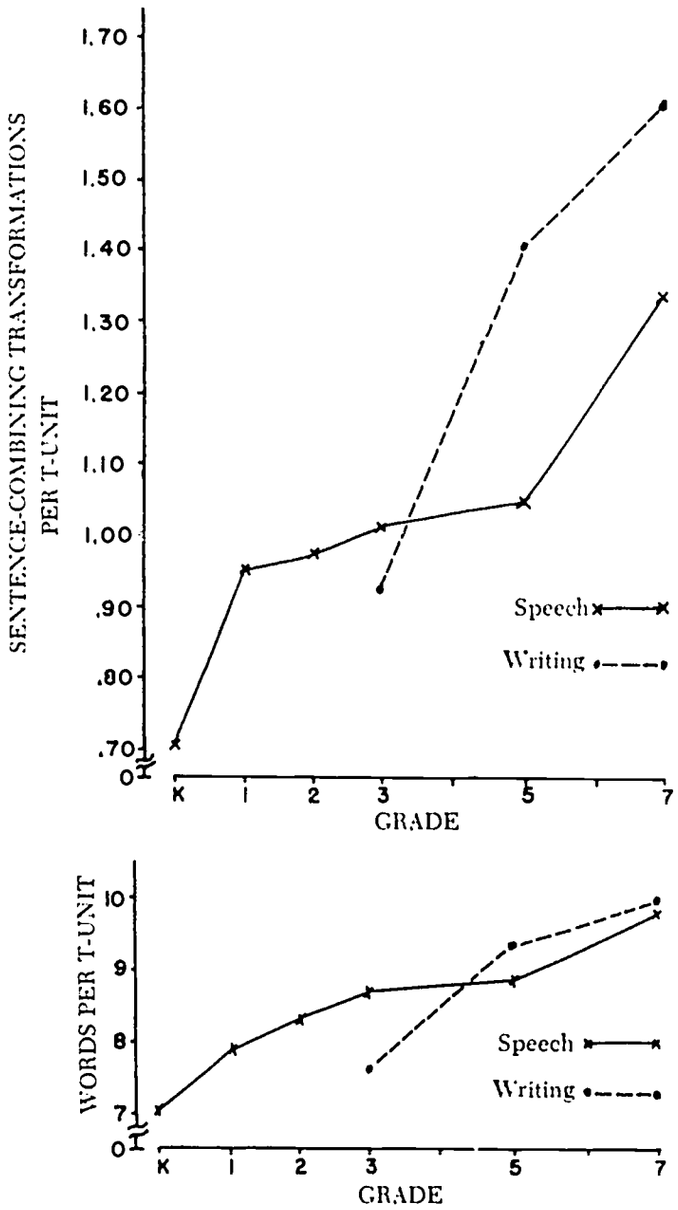

Figure 6. Comparison of increases from stage to stage in word length of T-units and the number of sentence-combining transformations contained in them.

units of children in the advanced classes. The contrast in this respect in the two upper grades (though not in Grade 3) is statistically significant. This reinforces the impression that the older elementary school children had learned to control their written expression more carefully than their oral language production.

That the ratio of sentence-combining transformations to T-units in the writing of the older children who were subjects of this investigation was not extraordinarily high is shown by a comparison with the findings of Hunt (1964). Figure 7 graphs the data obtained on this ratio in the writing of the children in Murfreesboro, Tennessee, and that obtained by Hunt in his study of writing of children in Tallahassee, Florida. The figure shows a smaller increase in the ratio in writing of seventh graders in Murfreesboro, but it must be remembered that grade gaps in samplings of the two studies are not identical.

Sex differences in the ratio of sentence-combining transformations to T-units all turn out to be statistically nonsignificant. Yet Table 9 shows that scores for boys in oral samples were higher except in Grade 5, while scores for girls exceeded those of boys in written compositions in Grades 3 and 5, though not in Grade 7.

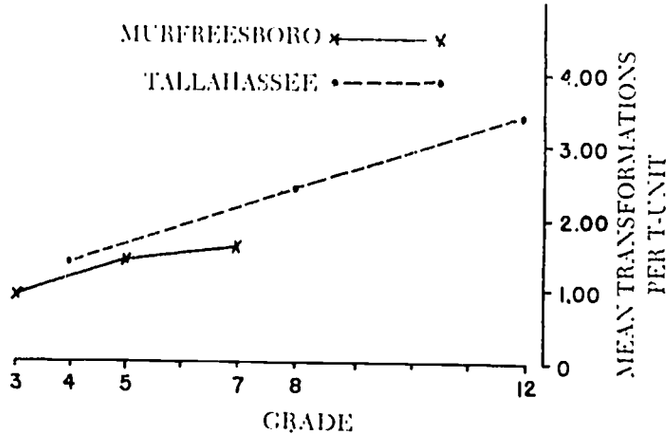

Figure 7. Mean number of sentence-combining transformations per T-unit in children's writing in Tallahassee, Florida, and Murfreesboro, Tennessee. (Ref.: Hunt, 1964, p. 140.)

Kinds and Functions of Sentence-Combining Transformations

Beyond measuring magnitudes of units in language production and calculating the number of transformations absorbed into those units, an account of children's control of syntax requires specific description of the grammatical constructions they employ. The greater part of the data presented in this report is concerned with relative frequencies of occurrence of various kinds of sentence-combining transformations and their functions in the language samples studied. Displays of the data are offered in Tables 10 through 22. In every instance, frequencies are represented by the rate of occurrence per 100 T-units.

One type of sentence-combining transformation, it was explained in Chapter I, is characteristically overused by immature speakers and writers. Hunt (1964) noted that in writing the frequency of coordination of main clauses varied inversely (and significantly) with advances in grade level; Strickland (1962) and Loban (1963) both presented examples to illustrate such immature coordination in speech —usually involving use of the conjunction *and*. Overfondness for coordination of main clauses on the part of young children is one reason for adopting the T-unit as the basis for syntactic analysis. Table 10 shows the relative numbers of T-units introduced by coordinating conjunctions in language samples studied here.

Coordination of from one third to four fifths of all main clauses in oral expression would certainly seem to be excessive, and the high percentage of such coordination in writing as shown in Table 10 is no doubt indicative of immaturity. It is a reasonable inference that this feature of the language production here studied is to be attributed in part, however, to the narrative character of the compositions. The fact that the children were mainly concerned with narration may particularly have militated against marked reduction of main-clause coordination in the upper grades. Hunt (1964), in papers on unspecified subjects, found coordinating conjunctions introducing 26.94 percent of the main clauses written by fourth graders, 17.67 percent of those written by eighth graders, and only 13.48 percent of those written by twelfth graders.[1]

The reduction in incidence of main-clause coordination in

[1]These percentages have been worked out from data presented in Table 3, p. 20, of Hunt's report (1964) and from information in a personal communication from Kellogg W. Hunt, dated September 29, 1965.

TABLE 10—Incidence of Initial Coordinating Conjunctions in T-units in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Speech						
Boys						
And	53.08	50.22	62.21	66.15	74.21	66.02
But	2.13	1.51	1.16	1.88	1.19	1.42
So	1.10	2.80	4.62	4.65	4.67	3.93
Or				.11	.17	.22
Total	56.31	54.53	67.99	72.79	80.24	71.59
Girls						
And	47.98	60.81	70.03	68.55	77.49	73.47
But	.95	1.80	.90	1.73	2.05	1.82
So	2.37	1.58	2.56	2.30	2.71	3.31
Total	51.30	64.19	73.49	72.58	82.25	78.60
Both						
And	50.53	55.51	66.12	67.35	75.85	69.74
But	1.54	1.65	1.03	1.81	1.62	1.62
So	1.73	2.19	3.59	3.48	3.69	3.62
Or				.06	.09	.13
Total	53.80	59.36	70.74	72.70	81.25	75.11
Writing						
Boys						
And				19.95	21.81	16.17
But				4.05	3.74	2.97
So				5.57	5.16	2.35
For					.16	
Or					.16	.10
Total				29.57	31.03	21.59
Girls						
And				14.46	16.50	16.79
But				2.65	3.96	3.80
So				4.07	5.45	3.96
Or					.17	
Total				21.18	26.08	24.55
Both						
And				17.20	19.15	16.48
But				3.35	3.85	3.38
So				4.82	5.30	3.15
For					.08	
Or					.16	.06
Total				25.37	28.54	23.07

seventh grade speech was statistically significant, as were also the increases in Grades 2 and 3. The differences between speech and writing were significant in all three grades. In neither speech nor writing were there significant sex differences in any grade.

Coordination of main clauses now having been disposed of, all other syntactic constituents formed from transformations incorporated into larger grammatical structures will be reported within the three categories into which they were classified: (1) Nominal Constructions, (2) Adverbial Constructions, and (3) Coordinate Con-

TABLE 11—Incidence of Nominal, Adverbial, and Coordinate Constructions Formed by Sentence-Combining Transformations in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Nominal Constructions						
Speech						
Boys	56.93	66.47	61.50	63.71	59.19	80.77
Girls	41.97	59.33	58.06	59.88	65.36	68.61
Both	49.40	62.90	59.78	61.79	62.27	74.69
Writing						
Boys				51.79	72.37	101.35
Girls				65.19	80.50	86.77
Both				58.49	76.43	94.06
Adverbial Constructions						
Speech						
Boys	7.93	10.67	13.29	14.79	13.50	19.88
Girls	7.07	12.67	10.25	15.88	16.29	19.31
Both	7.50	11.67	11.77	15.33	14.89	19.59
Writing						
Boys				12.21	13.69	25.35
Girls				13.81	24.37	23.23
Both				13.01	19.03	24.29
Coordinate Constructions						
Speech						
Boys	16.20	20.20	26.50	24.29	30.56	46.41
Girls	13.13	19.67	24.25	21.88	25.50	31.00
Both	14.67	19.93	25.37	23.09	28.03	38.71
Writing						
Boys				18.21	49.50	42.23
Girls				22.50	39.71	41.39
Both				20.35	44.61	41.81

structions within T-units. Nominal constructions have been divided into noun-headed structures and non-headed structures occupying nominal positions in sentences. The adverbial constructions include adverbial clauses, sentence adverbials, and adverbial infinitives. The constituents of coordinate constructions (often joined by coordinating conjunctions) may, of course, be single words, phrases, or dependent clauses. It should be clear that, though the other two categories are mutually exclusive, coordinate constructions may be composed of nominal, verbal, adjectival, or adverbial elements. Such elements are properly distributed at other points in the analysis, but it is useful to have an overall accounting of coordination with T-units.

Rates at which the general classes of constructions were represented in speech and writing may be inspected in Table 11.

Sentence-Combining Transformations in Nominal Constructions

The rate of occurrence of sentence-combining transformations in nominal constructions increased significantly in Grades 1 and 7, and the overall increment in the frequency of such transformations was also significant, in spite of the fact that no notable development occurred between the end of Grade 1 and the end of Grade 5. Except in Grade 5, the transformations within nominals were markedly more frequent in the oral expression of boys than of girls.

In writing, the incidence of sentence-combining transformations in nominals increased significantly in both Grade 5 and Grade 7. Third grade girls used these transformations more frequently in writing than in speech, but the boys used them much less often in writing. In the fifth and seventh grades, however, both sexes employed them with significantly greater frequency in writing than in speech, and in Grade 7 the boys used them significantly more often in writing than did the girls.

If increased exploitation of these transformations marks development of syntactic control in children's language, the data just reviewed indicate once more that in speech the greatest advances occurred in Grade 1 and in the period between the end of Grade 5 and the end of Grade 7. They also reinforce the observation that mastery of syntax in writing developed so rapidly in the upper grades that by the end of Grade 7 it outran the acquisition of such control in speech. Finally, they suggest, as does other evidence, that the girls achieved facility in writing more rapidly than did the boys in the

Grade 3-5 time span but that the boys had closed the gap by the end of the seventh grade.

Tables 12 through 15 show the rates of occurrence of sentence-combining transformations in various subtypes of nominal constructions. Headed nominal constructions, reported in Tables 12 and 13, are those in which the modified noun could by itself function grammatically as the whole construction does. The various modifiers may be specified and exemplified within constructions as follows: noun adjuncts (*North Wind*), adjectives (*cold rain*), genitive forms of nouns or pronouns (*man's coat* or *his coat*), relative clauses (*man who was wearing a coat*), prepositional phrases (*bird in a tree*), infinitives (*food to eat*), participles and participial phrases (*falling leaf* or *the ant rolling the ball*), and words usually classified as adverbs (*man outside*). Non-headed nominal structures, reported in Tables 14 and 15, are constructions that function syntactically as wholes in fashions typical of nouns but cannot be grammatically replaced by a single word contained in them. Such structures are identified by italics in the examples of subtypes shown here as functioning within larger constructions: noun clauses (The dove saw *that the ant was drowning*), infinitive phrases (He wanted *to return the favor*), infinitive phrases with subjects (The sun made *the flowers bloom*), and gerund phrases—often objects of prepositions (The dove kept him from *being drowned*).

An obvious generalization indicated by the calculation of incidence of subtypes of nominals formed by sentence-combining transformations is that in oral discourse there were fluctuations of some magnitude, a number of overall increments that are significant, but few observable consistent trends. In the comparison of Grades 5 and 7, the increase in use of noun adjuncts was considerable, and the seventh grade increments in employment of the adjective+noun and the noun+prepositional phrase were found to be statistically significant. The inflected genitive showed an overall increase in rate of use; its incidence in the speech of second graders as compared to that in the speech of first grade children is statistically significant. Except in the second grade, there were steady increases in the use of participial modifiers from stage to stage. Though the gains were small, the final result was that seventh graders used participles as constituents of nominal constructions more than three times as frequently as kindergarten children did. This construction was used more frequently by boys than by girls at every stage; it is the only

type of nominal that was identified as consistently favored by either of the sexes in oral discourse.

TABLE 12—Headed Nominal Constructions Formed by Sentence-Combining Transformations in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Noun+Noun						
Boys	7.47	9.87	7.43	8.14	9.75	12.94
Girls	8.53	7.00	7.38	11.63	9.79	10.38
Both	8.00	8.43	7.41	9.89	9.77	11.66
Noun+Adjective						
Boys	5.53	11.07	9.14	6.43	7.63	10.82
Girls	7.40	6.93	10.69	6.63	8.86	13.21
Both	6.47	9.00	9.91	6.53	8.25	12.07
Noun+Genitive Form						
Boys	12.13	12.80	18.93	19.43	17.56	17.35
Girls	10.73	12.53	15.25	17.00	19.43	18.08
Both	11.43	12.67	17.09	18.21	18.49	17.71
Noun+Relative Clause						
Boys	4.20	2.67	2.50	4.14	3.38	4.65
Girls	5.33	3.33	3.81	1.13	3.14	3.15
Both	4.77	3.00	3.15	2.63	3.26	3.90
Noun+Prepositional Phrase						
Boys	4.47	3.27	3.36	3.14	6.00	9.71
Girls	3.33	2.67	5.31	4.00	4.50	4.92
Both	3.90	2.97	4.33	3.57	5.25	7.31
Noun+Infinitive Phrase						
Boys	1.10	—	.21	.14	.19	.65
Girls	.47	.20	.50	.19	1.07	.15
Both	.79	.11	.35	.17	.63	.40
Noun+Participle or Participial Phrase						
Boys	1.27	1.80	1.71	1.93	2.00	3.35
Girls	.33	.40	.06	1.13	1.71	1.62
Both	.80	1.10	.89	1.53	1.85	2.49
Noun+Adverb						
Boys	—	—	—	.11	.09	.43
Girls	—	—	—	.35	—	.11
Both	—	—	—	.23	.04	.27

TABLE 13—Headed Nominal Constructions Formed by Sentence-Combining Transformations in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Noun + Noun			
Boys	12.64	14.56	17.35
Girls	9.50	12.21	11.77
Both	11.07	13.39	14.56
Noun + Adjective			
Boys	5.43	12.71	12.91
Girls	7.87	8.19	13.85
Both	6.65	10.45	13.39
Noun + Genitive Form			
Boys	14.36	23.63	22.29
Girls	17.56	19.79	23.85
Both	15.96	21.71	23.07
Noun + Relative Clause			
Boys	1.29	2.31	5.53
Girls	.69	4.43	3.39
Both	.99	3.37	4.46
Noun + Prepositional Phrase			
Boys	4.64	5.37	11.71
Girls	4.00	6.43	8.15
Both	4.32	5.90	9.93
Noun + Infinitive Phrase			
Boys	.21	.13	.47
Girls	.50	.21	.77
Both	.35	.17	.62
Noun + Participle or Participial Phrase			
Boys	2.00	2.87	6.77
Girls	2.63	2.14	3.85
Both	2.31	2.51	5.31
Noun + Adverb			
Boys	.25	—	.76
Girls	—	.33	.15
Both	.13	.16	.45

One of the most enigmatic features in the whole array of data collected in this study is the showing that kindergarten children used relative clauses more frequently than did children at any other stage, in either speech or writing. Harrell (1957), studying the language of children from 9 to 15 years of age, found that such clauses were used less frequently than noun clauses or adverb

clauses in oral stories produced at each age level, and less frequently, too, in the written stories of 9-year-olds and 11-year-olds. Noting that Watts (1944) had made a similar observation about the writing of children up to the age of 11, Harrell inferred that younger children have a less well developed understanding of the uses of adjective clauses than of other types and that they find them harder to manipulate. The present study also shows relative clauses less frequently used than noun clauses and adverb clauses, but the relative difference in frequency was least marked at the youngest age. Harrell further found that, in writing, the children he studied used adjective clauses more often than noun clauses at the 13- and 15-year age levels. The present study does not show such a characteristic in the writing of older children.

The non-headed nominals in the oral samples showed no particularly notable overall increases in use. The curious fluctuation in the frequencies of infinitives with subjects seems difficult to explain. A statistically significant increase in Grade 1 was followed by a significant drop in Grade 2; the rate of occurrence in Grade 7 was almost identical with that among kindergarten children.

TABLE 14—Non-Headed Nominal Constructions Formed by Sentence-Combining Transformations in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Noun Clause						
Boys	8.80	7.13	6.50	8.71	4.56	9.92
Girls	2.33	7.40	7.50	8.13	7.07	7.92
Both	5.57	7.27	7.00	8.42	5.81	8.87
Infinitive Phrase						
Boys	3.67	4.47	3.29	2.71	2.56	4.00
Girls	.93	4.47	4.19	2.31	3.14	2.77
Both	2.30	4.47	3.74	2.51	2.85	3.39
Infinitive with Subject						
Boys	6.87	12.20	7.29	7.21	3.38	4.53
Girls	2.27	13.06	5.19	6.56	4.79	4.15
Both	4.57	12.63	6.24	6.89	4.07	4.34
Gerund Phrase						
Boys	.60	.43	1.07	1.14	.88	.88
Girls	.53	--	.25	.88	.86	.77
Both	.57	.22	.66	1.01	.87	.83

TABLE 15—Non-Headed Nominal Constructions Formed by Sentence-Combining Transformations in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Noun Clause			
Boys	4.86	5.00	8.18
Girls	10.63	10.00	6.77
Both	7.75	7.50	7.47
Infinitive Phrase			
Boys	1.29	2.50	4.29
Girls	3.75	3.21	4.54
Both	2.52	2.85	4.41
Infinitive with Subject			
Boys	4.71	6.87	8.06
Girls	7.06	6.36	6.08
Both	5.89	6.61	7.07
Gerund Phrase			
Boys	.36	1.25	2.12
Girls	1.25	1.36	3.31
Both	.81	1.31	2.71

The facts about nominal constructions in written composition are quite different. Among headed structures, only the noun+infinitive phrase failed to show at least slight gains in frequency from grade to grade. Non-headed nominals containing infinitives showed consistent gains, and the use of gerund phrases increased in Grade 5, though noun clauses lost a little ground in both fifth and seventh grade compositions. With four exceptions (three of them in Grade 3), headed nominal constructions were used more frequently in writing than in speech. Considered as a single set, headed and non-headed nominals involving sentence-combining transformations occurred with significantly greater frequency in writing than in speech in Grades 5 and 7.

The differences in rates of occurrence of nominal constructions in oral and written discourse at three grade levels are made clear in Table 16, derived from Tables 12 through 15. The figures are obtained by comparing the rates of occurrence per 100 T-units; a plus sign indicates greater frequency in writing and a minus, lesser frequency in writing than in speech. If it can be supposed that production of nominal constructions describable as resulting from sentence-combining transformations are indicative of syntactic control, it may be inferred from the data arranged in Table 16 that

TABLE 16—Differences in Rates of Occurrence of Nominal Constructions per 100 T-units in Writing and Speech at Three Grade Levels

Grade Level	*Third*	*Fifth*	*Seventh*
Noun + Noun	+ 1.18	+ 3.82	+ 2.90
Noun + Adjective	+ .12	+ 2.20	+ 1.32
Noun + Genitive Form	− 2.25	+ 3.22	+ 5.36
Noun + Relative Clause	− 1.64	+ .11	+ .56
Noun + Prepositional Phrase	+ .75	+ .65	+ 2.62
Noun + Infinitive Phrase	+ .18	− .46	+ .22
Noun + Participial Phrase	+ .78	+ .66	+ 2.82
Noun + Adverb	− .10	+ .12	+ .18
Noun Clause	− .67	+ 1.69	− 1.40
Infinitive Phrase	+ .01	—	+ 1.02
Infinitive with Subject	− 1.00	+ 2.54	+ 2.73
Gerund Phrase	− .20	+ .44	− 1.88

Note: Plus sign indicates greater frequency in writing; minus sign indicates lesser frequency in writing.

there was not much difference between the degree of control possessed by third graders in writing and in speech, but that in the upper grades development of mastery in writing outran growth toward maturity in speech. This statement is made without the implication that a common level of usage would be found in fully mature speech and writing.

In an interesting way, the findings related to writing reported here complement those of Hunt (1964). His study of noun modifiers formed by sentence-combining transformations in written compositions showed that fourth graders used all these structures only about 63 percent as often as twelfth graders did, while children in Grade 8 used them about 83 percent as often as twelfth graders did.[2] On more specific matters, too, Hunt's findings parallel those of this study. He reported (1964, p. 94) that the use of prepositional phrases to modify nouns doubled from Grade 4 to Grade 12. Such a doubling occurred between Grade 3 and Grade 7 in the writing analyzed here, the greatest increase appearing in Grade 7. As a more trivial item, he reported only fourteen instances of modification of a noun by an adverb in 54,000 words written by children in Tallahassee, Florida. The children of Murfreesboro, Tennessee, also used such

[2] The percentages noted here have been worked out from data given by Hunt (1964), p. 104.

constructions very sparingly, and not at all before the third grade.

Less revealing than the account of structural types of nominals built by sentence-combining transformations is the classification of grammatical functions performed by those constructions. Yet it is of legitimate interest, for it tells something about how the transforma-

TABLE 17—Grammatical Functions of Nominal Constructions Produced by Sentence-Combining Transformations in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Subject						
Boys	8.07	10.07	7.00	9.71	8.31	11.47
Girls	9.13	7.53	10.75	10.81	8.71	12.38
Both	8.60	8.80	8.87	10.25	8.51	11.95
Direct Object						
Boys	34.37	40.87	35.43	36.64	32.25	42.24
Girls	21.27	42.53	33.56	31.50	37.36	35.23
Both	27.87	41.70	34.49	34.07	34.81	38.73
Indirect Object						
Boys	—	.21	—	—	—	.07
Girls	—	.22	—	—	—	.11
Both	—	.21	—	—	—	.09
Subject Complement						
Boys	3.27	3.47	2.43	1.79	1.00	2.24
Girls	3.27	2.53	1.38	1.25	1.79	1.31
Both	3.27	3.00	1.91	1.52	1.39	1.77
Object Complement						
Boys	—	—	—	—	.09	.29
Girls	—	—	—	—	—	.22
Both	—	—	—	—	.04	.25
Appositive						
Boys	.22	.43	.49	.33	.43	.65
Girls	—	.45	—	—	—	.76
Both	.11	.44	.24	.17	.22	.71
Object of Preposition						
Boys	8.93	10.40	14.57	14.53	15.69	22.76
Girls	7.13	5.87	12.19	15.06	15.43	17.38
Both	8.03	8.13	13.38	14.75	15.26	20.07
Adverbial Nominal						
Boys	1.10	1.29	1.15	1.22	1.19	1.29
Girls	.23	.45	1.20	1.04	1.59	.97
Both	.67	.87	1.17	1.13	1.39	1.13

tions affect different parts of the sentence. Data on this subject are organized in Tables 17 and 18. Nominal functions not listed in those tables either were unrepresented in the language samples or were so rare as to make statistical comparisons unfeasible. To make the discussion of the data clearer, examples of transformation-produced

TABLE 18—Grammatical Functions of Nominal Constructions Produced by Sentence-Combining Transformations in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Subject			
Boys	9.07	12.63	18.29
Girls	10.81	11.00	15.15
Both	9.94	11.81	16.72
Direct Object			
Boys	29.00	38.87	44.47
Girls	40.44	44.36	40.46
Both	34.72	41.61	42.47
Indirect Object			
Boys	—	—	.33
Girls	—	—	—
Both	—	—	.19
Subject Complement			
Boys	.93	.56	2.00
Girls	1.44	.71	1.39
Both	1.19	.63	1.79
Object Complement			
Boys	.22	—	.51
Girls	.44	.17	—
Both	.33	.08	.31
Appositive			
Boys	—	—	.33
Girls	—	.49	—
Both	—	.24	.19
Object of Preposition			
Boys	10.93	18.13	34.29
Girls	11.37	20.36	25.77
Both	11.15	19.25	30.03
Adverbial Nominal			
Boys	1.77	2.02	1.30
Girls	2.01	2.41	2.19
Both	1.89	2.22	1.75

nominals functioning variously within sentences are given here, with constructions in question italicized.

SUBJECT: *A hunter on his way hunting* sees an apple tree.
DIRECT OBJECT: A hunter on his way hunting sees *an apple tree*.
INDIRECT OBJECT: He was going to give *the little boys* two apples.
SUBJECT COMPLEMENT: I guess it was *a wind machine*.
OBJECT COMPLEMENT: The sun made it *a pretty day*.
APPOSITIVE: I made a play house, *a great big one*.
OBJECT OF PREPOSITION: A hunter on *his way hunting* sees an apple tree.
ADVERBIAL NOMINAL: It rode along *a little way*.

Among the nominals dealt with here, those used as subject showed no significant differences in rate of occurrence in speech subsamples, but they appeared with significantly greater frequency in the writing than in the speech of children in Grades 5 and 7. Subject complements did not vary significantly in frequency in either speech or writing at any grade level, though there was a general decline in their occurrence after the first grade.

The most important feature of nominal constructions used as direct objects seems to be their marked prominence at all grade levels. In oral samples they increased from kindergarten to Grade 7, but only the increment in Grade 1 was significant. In writing, they were used much more often by fifth and seventh graders than by third graders, but the difference failed to reach the .05 level of significance. Fifth graders used them with significantly greater frequency in writing than in speech.

The nominal function that increased most steadily and impressively from grade level to grade level was that of the object of a preposition. In speech, though the increment in the first grade was small, all others were considerable, and those in Grades 2 and 7 were statistically significant. Use of transformation-produced nominals with this function increased two and a half times from kindergarten to Grade 7. Such constructions were less frequent in the writing than in the speech of third graders, but were more often used in writing than in speech in the upper grades. The difference in incidence in speech and writing was statistically significant in Grade 7. These facts are capable of being interpreted as further indications of relatively more rapid development of syntactic control in written than in oral expression in the upper grades.

Indirect objects, object complements, appositives, and adverbial nominals resulting from sentence-combining transformations oc-

curred very infrequently in the material analyzed for this study, and there were no statistically significant differences in their incidence in the various subsamples. Only in the language production of the seventh graders were units performing all these functions to be found.

Sex differences related to nominal functions appear to be relatively unimportant; fluctuations rather than consistent trends were characteristic of the subsamples. The only differential generalizations that can be made about the speech samples are that transformations producing subjects were used with somewhat greater frequency by girls, except in Grade 2, and those producing objects of prepositions were used more often by boys, except in Grade 3. In writing, however, girls markedly exceeded boys in the use of transformations producing adverbial nominals in all three grades, subjects and subject complements in Grade 3, and direct objects and objects of prepositions in Grades 3 and 5. With the exceptions of subjects and objects of prepositions in Grade 3, the girls also used these constructions more often in writing than in speech. These facts may indicate that girls make more rapid early progress in writing than boys do. In Grade 7, however, boys equalled or exceeded girls in the use of nominal transformations performing nearly every function identified.

Adverbial Constructions

The rate of use of the whole class of adverbial constructions identified as resulting from sentence-combining transformations was significantly increased over the grade spans in both speech and writing. In oral expression, significant increments occurred in Grades 1 and 7. In writing, increments were significant in both Grade 5 and Grade 7.

Tables 19 and 20 show rates of occurrence of subtypes of adverbial constructions. In these tabulations, interjected clauses (such as *I think* in the sentence, "It is better, I think, to be kind and gentle") are included among sentence adverbials, as are absolute constructions and other modifications affecting a sentence as a whole but not related directly to a constituent in it. The term "adverbial clauses" covers reduced comparisons and expressions like "the more the merrier," as well as clauses that modify (or complement) adjectives and those that modify predications. Adverbial infinitives are exemplified by the italicized expression in "The ant went out *to get some food*."

In oral expression, seventh graders used adverbial clauses more than twice as frequently as did children in kindergarten, though there were no significant differences in rates of use between adjacent grades. The statistically significant increment in speech of third grade girls is due mainly to the large and unaccountable drop in rate of use by girls in Grade 2. The speech samples showed a

TABLE 19—Adverbial Constructions Formed by Sentence-Combining Transformations in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Adverbial Clauses						
Boys	6.27	8.53	10.36	9.86	8.25	12.59
Girls	5.87	9.80	5.38	10.38	11.86	13.08
Both	6.07	9.17	7.87	10.12	10.05	12.83
Sentence Adverbials						
Boys	1.40	1.47	2.21	3.29	2.81	4.82
Girls	.93	1.87	3.50	3.50	2.57	3.69
Both	1.17	1.67	2.85	3.39	2.69	4.25
Adverbial Infinitives						
Boys	.33	.87	1.00	1.57	2.37	2.41
Girls	.20	1.00	1.44	4.25	1.57	2.39
Both	.27	.93	1.22	2.91	1.97	2.40

TABLE 20—Adverbial Constructions Formed by Sentence-Combining Transformations in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Adverbial Clauses			
Boys	8.43	11.31	18.12
Girls	9.44	20.00	17.08
Both	8.93	15.65	17.60
Sentence Adverbials			
Boys	.57	1.19	2.23
Girls	1.19	1.64	5.85
Both	.88	1.41	4.04
Adverbial Infinitives			
Boys	3.21	1.25	5.18
Girls	3.19	2.50	3.08
Both	3.20	1.87	4.13

general increase by grade in occurrences of sentence adverbials; the increment in Grade 7 was statistically significant, though that fact is a little less impressive when the fifth grade drop in frequency is noted. In spite of a marked overall increase in incidence of adverbial infinitives in the children's speech, the only significant difference in use from grade to grade was an extraordinary peak in the expression of third grade girls.

Adverbial clauses in writing were used significantly more often by fifth than by third graders. They occurred at a significantly higher rate in writing than in speech in Grades 5 and 7 and attained an unexplainably high frequency in the compositions of fifth grade girls. Among third graders these clauses were used more often in speech than in writing; the difference between their employment by third and fifth graders was significant.

Sentence adverbials appeared more frequently in speech than writing, though the difference was slight in Grade 7. An increment in their use in writing was significant in Grade 7. Adverbial infinitives occurred oftener in writing than in speech only in Grades 3 and 7, and not significantly so there. There was a significant increase in their use in seventh grade writing, attributable mainly to boys.

Except for sporadic contrasts that have been noted, tabulation of adverbial constructions shows little about differences between behavior of boys and of girls. There were some divergences, but no meaningful patterns are suggested.

Coordinate Constructions within T-units

From kindergarten through Grade 7, there was a significant increase in the rate at which the whole class of coordinate constructions within T-units occurred in speech. Significant increments appeared in Grades 2, 5, and 7. No such increments were observed in writing.

Data on subtypes of coordinate constructions are found in Tables 21 and 22. It should be remembered that coordination of main clauses is here excluded. All other coordinations are accounted for, however, since such constructions are seen as being always formed from sentence-combining transformations.

Hunt (1964, p. 81), having remarked that problems of coordination within T-units "require considerable grammatical perception," reported that in the eighth grade writing he analyzed there was a moderate rise in the frequency of such coordination; but

TABLE 21—Coordinate Constructions (Excluding Coordination of Main Clauses) in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Coordinate Nominals						
Boys	6.73	5.67	7.86	5.21	6.44	15.46
Girls	3.00	8.73	7.75	5.25	7.21	11.15
Both	4.87	7.20	7.81	5.23	6.83	13.31
Coordinate Modifiers						
Boys	1.93	1.73	3.14	3.64	2.63	4.65
Girls	1.33	2.00	1.94	2.00	3.50	3.31
Both	1.63	1.87	2.54	2.82	3.07	3.98
Coordinate Predicates						
Boys	7.53	12.80	15.41	15.07	21.06	26.47
Girls	8.80	8.93	14.56	16.31	14.57	18.38
Both	8.17	10.87	14.99	15.69	17.81	22.43

TABLE 22—Coordinate Constructions (Excluding Coordination of Main Clauses) in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Coordinate Nominals			
Boys	3.93	7.37	9.18
Girls	4.41	8.14	10.23
Both	4.19	7.75	9.71
Coordinate Modifiers			
Boys	2.36	3.56	2.71
Girls	1.44	3.14	2.85
Both	1.90	3.35	2.78
Coordinate Predicates			
Boys	12.07	38.44	30.41
Girls	16.50	28.43	28.23
Both	14.29	33.43	29.32

that the use by twelfth graders fell below that in Grade 4. A generally similar kind of phenomenon has been identified in the writing samples analyzed in the present study; the findings here reported, together with those of Hunt, may indicate that maximal use of coordinations within T-units in writing develops at about the fifth or sixth grade level.

Inspection of Tables 21 and 22 will show that these con-

structions without exception occurred less frequently in writing than in speech at the third grade level, but that while there were slight increases in oral use in Grade 5, in the writing of fifth graders the increments outstripped those in speech. The increases in rates of occurrence of coordinate nominals and coordinate predicates in the writing of fifth graders are statistically significant. On the other hand, only coordinate predicates are more frequent (and significantly so) in writing than in speech of seventh graders. While seventh graders showed a significantly greater use of all types of coordinates in writing then did third graders, they used fewer coordinate modifiers and coordinate predicates than did fifth graders. The increment in use of coordinate nominals in writing in Grade 7 was not significant.

In speech, coordinate nominals were used by seventh graders more than two and a half times as often as by preschool children, but as between adjacent grade levels, only the increment from Grade 5 to Grade 7 is statistically significant. Frequencies in Grades 3 and 5 were below those in Grades 1 and 2, but the differences are not significant.

Coordinate modifiers in speech subsamples were remarkable for the steadiness of their increased use, and the overall increment from kindergarten to Grade 7 is statistically significant, but there were no significant differences between adjacent grade levels. There was an overall increment in the use of coordinate predicates in speech by grade, and here the difference between Grades 5 and 7 is significant.

The only significant sex-related difference in use of coordinate constructions in the subsamples was the more frequent use of coordinate predicates in speech by boys than by girls in Grades 5 and 7.

Structural Patterns of Main Clauses

As explained in Chapter I, this study, unlike those of Strickland, Loban, and Hocker, is not concerned with minor features of sentence patterns, most of which result simply from varied positions of modifiers. Rather, it identifies the "fixed slot" structures of main clauses and reports their relative frequencies. In this respect, it is comparable to the investigation of children's writing made by Sam and Stine (1965). The distribution of clausal patterns in subsamples is specified in Tables 23 and 24.

TABLE 23—Structural Patterns of Main Clauses in Speech of Boys and Girls at Six Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Subject-Verb						
Boys	34.07	31.87	34.07	40.93	46.63	43.12
Girls	38.27	34.13	43.56	44.69	45.14	46.23
Both	36.17	33.00	38.81	42.81	45.89	44.67
Subject-Verb-Object						
Boys	41.93	46.40	47.86	44.71	42.19	40.94
Girls	38.93	46.53	40.75	43.68	42.21	42.23
Both	40.43	46.47	44.31	44.29	42.20	41.59
Subject-Verb-Predicate Nominal						
Boys	6.13	4.07	3.14	2.79	1.88	3.29
Girls	4.00	2.93	1.25	1.69	1.93	1.54
Both	5.07	3.50	2.19	2.24	1.91	2.41
Subject-Verb-Predicate Adjectival						
Boys	2.40	1.93	3.64	2.14	3.56	4.06
Girls	2.60	4.27	3.56	2.81	3.21	2.77
Both	2.50	3.10	3.60	2.47	3.39	3.41
Subject-Verb-Indirect Object-Direct Object						
Boys	.44	.43	.33	.22	.42	.50
Girls	—	1.12	1.05	.11	.93	.43
Both	.23	.77	.69	.17	.67	.47
Subject-Verb-Object-Object Complement (Nominal)						
Boys	.22	—	—	—	—	.14
Girls	—	—	—	—	—	.11
Both	.11	—	—	—	—	.13
Subject-Verb-Object-Adjectival Complement						
Boys	—	.43	.49	.56	.51	1.44
Girls	.47	.67	.60	.23	.84	.54
Both	.23	.55	.55	.39	.67	.99
Adverbial-Verb-Subject						
Boys	.44	.43	.49	—	.09	—
Girls	.23	—	.15	—	—	.22
Both	.33	.22	.32	—	.04	.09
There-Verb-Subject						
Boys	.87	1.13	1.00	3.57	2.13	2.65
Girls	2.53	1.53	2.75	2.19	1.93	2.54
Both	1.70	1.33	1.87	2.88	2.03	2.59
It-Verb-Subject						
Boys	—	.64	.33	.22	.25	.21
Girls	.23	.90	.30	.23	.19	.22
Both	.11	.77	.31	.23	.22	.21
Passive Constructions						
Boys	1.07	.20	.79	.43	—	.76
Girls	—	.73	.44	.38	.86	.92
Both	.58	.47	.61	.41	.40	.84

TABLE 24—Structural Patterns of Main Clauses in Writing of Boys and Girls at Three Grade Levels: Rate of Occurrence per 100 T-units

	Grade 3	*Grade 5*	*Grade 7*
Subject-Verb			
Boys	34.86	40.31	41.12
Girls	33.56	38.43	45.61
Both	34.21	39.37	43.37
Subject-Verb-Object			
Boys	50.50	48.19	42.82
Girls	50.44	49.93	39.69
Both	50.47	49.06	41.25
Subject-Verb-Predicate Nominal			
Boys	1.50	1.25	1.35
Girls	2.24	.43	1.77
Both	1.97	.84	1.56
Subject-Verb-Predicate Adjectival			
Boys	4.64	3.56	6.77
Girls	3.19	3.86	5.00
Both	3.91	3.71	5.89
Subject-Verb-Indirect Object-Direct Object			
Boys	1.01	.31	.65
Girls	.81	.33	.44
Both	.91	.32	.55
Subject-Verb-Object-Object Complement (Nominal)			
Boys	.25	—	—
Girls	—	—	.11
Both	.11	—	.06
Subject-Verb-Object-Adjectival Complement			
Boys	.51	.62	.43
Girls	.81	.99	.65
Both	.66	.81	.54
Adverbial-Verb-Subject			
Boys	—	.15	.65
Girls	.20	—	.44
Both	.11	.08	.55
There-Verb-Subject			
Boys	2.07	1.06	1.59
Girls	2.44	1.93	1.54
Both	2.25	1.49	1.57
It-Verb-Subject			
Boys	.25	.31	.54
Girls	.20	.49	.29
Both	.23	.40	.41
Passive Constructions			
Boys	.21	.31	.71
Girls	.50	1.00	1.39
Both	.35	.65	1.05

In the following list of clausal patterns found in the material analyzed, the descriptive labels are followed by examples.

SUBJECT-VERB: *The bird flew away.*
SUBJECT-VERB-OBJECT: *The ant found another ball.*
SUBJECT-VERB-PREDICATE NOMINAL: *They were friends.*
SUBJECT-VERB-PREDICATE ADJECTIVAL: *Everything was calm.*
SUBJECT-VERB-INDIRECT OBJECT-OBJECT: *The dove threw him a leaf.*
SUBJECT-VERB-OBJECT-OBJECT COMPLEMENT: *I'd call it a flute.*
SUBJECT-VERB-OBJECT-ADJECTIVAL: *That made him happy.*
ADVERBIAL-VERB-SUBJECT: *Here came a hunter.*
EXPLETIVE-VERB-SUBJECT
(a) *There*-verb-subject: *There was a bird in the tree.*
(b) *It*-verb-predicate adjectival-subject: *It is better to be gentle.*

Passive constructions (*The trees had been blown down*) and grammatically incomplete constructions (*Because the sun was hotter*) are also reported, the latter in Table 25. It is probably unnecessary to point out that dependent clauses may operate as units within the patterns that are described here.

Most of the main clauses in the language production studied conform to the subject-verb or subject-verb-object patterns. These patterns account for about 80 percent of all T-units of the three younger groups of children, and about 85 percent of those used in both speech and writing in Grades 3, 5, and 7. Less than 10 percent of the T-units had linking verbs followed by a predicate nominal or adjectival (types 3 and 4 above). Of all the other patterns, only the expletive-verb-subject occurred in the language of a whole grade as often as once in 100 T-units. Most of the normal clause patterns, however, did occur at all grade levels sampled.

In oral samples, the subject-verb pattern showed a slight decrease from kindergarten to the end of Grade 1, but a significant increase from Grade 1 to Grade 2 and further, but smaller, increases in use in Grades 3 and 5. It was used oftener by girls than by boys at all grade levels except Grade 5. In writing, however, boys in Grades 3 and 5 used it more frequently than girls did. Its rate of occurrence was consistently lower in writing than in speech, and particularly so in Grade 3. This may be an indication of greater syntactic complexity in writing.

Within oral expression, the subject-verb-object and subject-verb-predicate adjectival patterns showed no remarkable differences in use

by grade or sex. The first of these patterns, however, was used with significantly higher frequency in writing than in speech in Grades 3 and 5, while the second was more prominent in writing than in oral discourse in all three grades from which writing samples were obtained.

It may be a revealing fact that kindergarten children used the subject-verb-predicate nominal type of clause proportionately more often than did any of the more advanced groups. This pattern is one that performs the simple functions of identification or equation. The steady decrement in its use up through the fifth grade is perhaps an indication of development of concerns that go beyond mere labeling. If we assume that growth toward maturity is characteristically accompanied by decreasing use of this clausal type, its less frequent appearance in writing than in speech, particularly in Grades 5 and 7, would support the inference that development proceeded more rapidly in written expression in the upper grades. Admission of that assumption, of course, requires the interpretation that in this respect girls demonstrated superiority to boys. In speech, the boys consistently used linking verbs followed by nominal complements at a higher rate than did girls; the difference was greatest in Grades 2 and 7. In writing, the contrast was less notable, and the relation was reversed in Grade 5.

None of the other grammatically complete patterns identified (including passive constructions) appeared very frequently in main clauses, and there were no significant differences in use among subsamples. As might be expected, the pattern used least at all grade levels was that in which a factitive verb is followed by both a direct object and an object complement; such constructions are relatively rare in adult speech and writing. Of the minor pattern types, the one most frequently employed was that in which the initial expletive *there* is followed by verb and subject, in that order. It was used at about the same rate in all grades, but a little less often in writing than in speech. The expletive construction was reported by Strickland (1962) and Loban (1964) as rarely observed in speech of children up through the sixth grade, and Sam and Stine (1965) apparently found no examples in writing samples obtained from the intermediate grades. Riling (1965), however, noted it fairly often in speech and writing of fourth and sixth graders, and she was led to account for that fact by reference to regional language habits. It may seem more probable that the use of expletives was

encouraged by the nature of stimulus conditions eliciting language samples studied by Riling and by the present investigators.

Only in the *speech* of kindergarten children, in third grade *writing*, and in *speech* and *writing* of seventh graders were found *all* the clausal patterns here identified. Perhaps the generalization suggested by these facts and by a close study of Tables 23 and 24 is that some preschool children, at least, have command of all the commonly used structural types of main clauses, but that ready exercise of such command, as well as discrimination that suppresses use of some patterns, develops most markedly in the upper grades—and particularly in writing.

Table 25 shows that there was a steady decrease in rate of use of incomplete clausal patterns through the school years. Though decrements from grade to adjacent grade were not large, overall reductions in both modes of expression were statistically significant. The higher frequencies of incomplete patterns in writing than in speech are not significant, although the difference in Grade 3 is notable. It may be another indication of relatively weaker control of writing at that stage. Interpretations of data in Table 25, however, must take into account the fact that the partials recorded there are not incoherencies; they are usually expressions such as are normal in English when a previous question or other feature of the situation may justify syntactic incompleteness of a language response.

The differences in use of incomplete patterns by boys and by girls were far from being consistent. Boys produced them in oral expression more frequently in Grades 1, 2, and 3, but not at other

TABLE 25—Grammatically Incomplete Clausal Patterns in Speech of Boys and Girls at Six Grade Levels and in Writing at Three Grade Levels: Rate of Occurrence per 100 T-units

	Kinder-garten	*Grade 1*	*Grade 2*	*Grade 3*	*Grade 5*	*Grade 7*
Speech						
Boys	9.33	9.87	7.36	4.00	1.81	1.59
Girls	10.47	6.40	4.94	3.19	2.64	1.54
Both	9.90	8.13	6.15	3.59	2.23	1.57
Writing						
Boys				3.29	3.44	2.06
Girls				5.25	2.00	2.15
Both				4.27	2.72	2.11

stages; they used them oftener than girls did in writing only in Grade 5. Girls in Grade 3 produced more partials in writing than in speech, but the reverse was true for boys; in Grade 5 the boys used them more frequently in writing than in speech. It is difficult to attach much importance to these and other smaller differences.

SUMMARY OF FINDINGS

Characteristics of Language Production at Various Grade Levels

1) False starts, abnormal redundancies, and word-tangles have in this report been grouped together as garbles, but the classification does not include audible pauses in oral expression. Relative to total amounts of language produced, garbles in speech were somewhat reduced in Grade 1, were increased in Grade 2, and then were moderately decreased in each succeeding grade. They occurred infrequently in writing at all grade levels, and their incidence (relative to length of compositions) was lower in Grades 5 and 7 than in Grade 3. The rate of use was a little higher in the seventh grade than in the fifth. In both modes of expression and in every grade, most of the garbles were attributable to a few individuals.

2) In both oral and written discourse, total length of responses increased with every advance in grade level.

3) Word-length of T-units also increased in both modes of expression with every advance in grade. In speech, the increments in Grade 1 and Grade 7 were statistically significant. Except in the speech of fifth graders, the percentage of short T-units (less than nine words long) decreased in both modes of expression with every advance in grade level. Particularly striking was the significant decrease in fifth grade writing.

4) The number of sentence-combining transformations absorbed by T-units increased (proportionally to the number of T-units) with every advance in grade level. In speech, the increments in Grade 1 and Grade 7 were significant; in writing, the same was true of increments in Grade 5 and Grade 7.

5) The rate of use of main-clause coordination in speech increased steadily through Grade 5, and increments in Grades 2 and 3 were statistically significant; reduction in the rate in Grade 7, however, was also significant. Fifth graders used such coordination in

writing oftener than third graders did, but seventh graders reduced their rate of use below that of third graders.

6) There were significant overall increases in the incidence of three major types of constructions formed by sentence-combining transformations (nominals, adverbials, and coordinations within T-units) in speech from kindergarten through Grade 7 and in writing from Grade 3 through Grade 7. In speech, increments in use of the nominal and adverbial constructions were significant in Grade 1 and Grade 7, and the same may be said of the coordinate constructions in oral expression of the seventh graders. In writing, there were significant increments in the use of nominal and adverbial constructions in Grades 5 and 7. Frequency of coordinate constructions within T-units increased significantly in fifth grade writing but declined in the writing of seventh graders.

7) Among subtypes of the nominal constructions studied, those in which a noun is modified by another noun, an adjective, a prepositional phrase, a participle, or a genitive form showed large overall increases in use by grade in both speech and writing. Nominals containing adjectives and prepositional phrases significantly increased in frequency in speech between Grade 5 and Grade 7. Inflected genitives showed a significant increment in Grade 2. In writing, significant increments were observed in the use of genitive modifiers and relative clauses in Grade 5, and in the use of prepositional phrases, participial phrases, and gerund phrases in Grade 7. Other nominal constructions, though their use generally increased (particularly in writing), reflected no statistically significant differences between adjacent grade levels. Relative clauses were used more often by kindergarten children than in any later grade.

8) Only a few notable variations were observed in frequencies of syntactic functions performed by nominal constructions containing sentence-combining transformations. In writing, the use of such nominals as subjects increased significantly in the seventh grade. Those acting as direct objects increased in both Grade 5 and Grade 7, but not significantly. Increments in use of those functioning as objects of prepositions were significant in both of the upper grades. In speech, such subjects, direct objects, and objects of prepositions increased markedly from kindergarten to Grade 7. The direct objects, however, were used most frequently in Grade 1 (where there was a significant increment). Increased use of the objects of prepositions was significant in the second and seventh grades. Subject complements

were used less frequently at each succeeding stage up to Grade 7, where their incidence rose slightly. In both speech and writing, the uses of transformation-produced nominals as indirect objects, object complements, appositives, and adverbial nominals were infrequent and fluctuating, though some showed slight overall increases.

9) With few exceptions, there were steady but moderate increases from grade to grade in the use of adverbial constructions formed by sentence-combining transformations. In speech, the frequency of adverbial clauses doubled between kindergarten and Grade 7, and adverbial infinitives were used more than eight times as often by seventh graders as by kindergarten children. Nevertheless, there were no statistically significant differences between adjacent grades. There was also an overall increase in use of sentence adverbials in oral discourse; the increment in Grade 7 was significant, but that fact is partly explained by a slight drop in frequency in Grade 5. In writing, use of adverbial clauses and sentence adverbials increased in both Grade 5 and Grade 7. The increment in adverbial clauses was significant in the fifth grade, as was that in the use of sentence adverbials in Grade 7. The statistical significance of the increased use of adverbial infinitives in the seventh grade is partly due to a reduction in their use by fifth graders.

10) Frequency of coordinate nominals and coordinate predicates within T-units in speech increased significantly from kindergarten to Grade 7, and the increments from Grade 5 to Grade 7 were also significant. Oral use of coordinate modifiers increased steadily from grade to grade; the overall increase was significant, but differences between adjacent grade levels were not. In writing, coordinate constructions as a whole were used with significantly greater frequency by seventh graders than by third graders, and seventh graders used coordinate nominals somewhat oftener than fifth graders did. Fifth graders, however, used all three types of coordinations more frequently in writing than did third graders, and increments in the use of coordinate nominals and coordinate predicates were significant. It appears that coordinate constructions attained a frequency peak in Grade 5.

11) Rates of occurrence of the various structural patterns of main clauses differed only a little from grade to grade; these dif-

ferences may be inconsequential. Attention, however, should be called to the following facts:

a) All the clausal patterns identified were used by at least some kindergarten children, and this can be said of no other group except seventh graders.

b) Two favorite patterns, the subject-verb and the subject-verb-object sequences, account for about 80 percent of the T-unit structures at the three lower grade levels and for about 85 percent of those in either speech or writing in Grades 3, 5, and 7.

c) Kindergarten children used the subject-verb-predicate nominal pattern with relatively greater frequency than did any other group. The rate of occurrence of this pattern decreased significantly, though not steadily, from the kindergarten level through the fifth grade.

d) In writing, there were significant increases in the use of the subject-verb pattern from Grade 3 to Grade 7 and in the use of the subject-verb-predicate adjectival pattern from Grade 5 to Grade 7. There was a significant decrease in the frequency of the subject-verb-object pattern in Grade 7.

12) With advance in grade level, there was a steady decrease in rate of occurrence of grammatically incomplete clause patterns. The overall decrement was statistically significant.

Difference Between Oral and Written Discourse in Grades 3, 5, and 7

1) Garbles were infrequent in the children's writing; they were plentiful in speech at all grade levels. (One must remember that the term "garbles" is not applied to audible pauses in oral expression.) Relative to total amounts of language produced, the rate of occurrence of garbles in speech compared to that in writing was more than nine times higher in Grade 3, a little less than nine times higher in Grade 5, and seven times higher in Grade 7. The incidence (again relative to total length of responses) was significantly reduced in speech of fifth graders and less markedly reduced in that of seventh graders; in writing, a considerable reduction in Grade 5 was followed by a small rise in Grade 7. Though a very few children were responsible for the largest number of garbles, the individuals who produced them most frequently in speech were gen-

erally not the ones who most often allowed them to stand in their writing.

2) Oral compositions were longer than written compositions at every grade level. The difference was least marked in Grade 7.

3) Word length of T-units was significantly greater in oral than in written expression in Grade 3; it was greater in writing than in speech in Grades 5 and 7, though not significantly so. T-units less than nine words long were much more frequent in writing than in speech of third graders, but they were by about the same amount less frequent in fifth and seventh grade writing. The reduction in the rate of use of such short units in Grade 5 writing was greater than was their decrease in speech over any four-year span.

4) The average number of sentence-combining transformations per T-unit was significantly greater in writing than in speech in Grades 5 and 7, and nonsignificantly greater in speech than in writing in Grade 3.

5) Initial coordinating conjunctions appeared in T-units in each of the grades about three times as often in speech as in writing.

6) The rate of occurrence of nominal constructions produced by sentence-combining transformations was higher in written than in oral material, and differences were significant for Grades 5 and 7. There was no significant difference between oral and written compositions in the rate of occurrence of adverbial constructions resulting from sentence-combining transformations. Coordinate constructions within T-units occurred at a significantly higher rate in written than in oral material in Grade 5. The slightly higher rates for coordinates in oral expression in Grade 3 and in writing in Grade 7 were not statistically significant.

7) Of the subtypes of nominal constructions formed by sentence-combining transformations, only those in which a noun is modified by a genitive form, a participle, an infinitive with subject, or a structure containing a gerund phrase showed significant differences in rate of occurrence in written and oral expression. The noun+genitive transformations appeared more frequently in third grade speech than in third grade writing, but they were used with significantly greater frequency in writing than in speech in Grades 5 and 7. Participles modifying nouns occurred more frequently in written than in oral expression in all three grades; the difference was significant in Grade 7. Constructions containing an infinitive with subject had a higher incidence in written than in oral ex-

pression in Grades 5 and 7, and the overall difference was significant. Gerund phrases occurred at a significantly higher rate in written than in oral compositions of seventh graders; they had been nonsignificantly more frequent in writing in Grade 5 and nonsignificantly more frequent in speech in Grade 3.

8) Among nominal constructions produced by sentence-combining transformations, those functioning as subjects occurred significantly more frequently in writing than in speech in Grades 5 and 7. Those functioning as direct objects also had a higher rate of occurrence in writing than in speech at all grade levels, and significantly so in Grades 5 and 7; the difference was most marked in Grade 5. Those which were objects of prepositions occurred nonsignificantly oftener in speech than in writing of third graders, nonsignificantly more often in writing than in speech of fifth graders, and significantly more frequently in writing than in speech of seventh graders.

9) Transformations producing adverbial clauses occurred at a significantly higher rate in written than in oral expression in Grades 5 and 7. Transformations forming sentence adverbials had a higher rate of use in oral than in written materials in each of the three grades, and the difference between the modes of expression is significant when all the grades are considered together. The difference, however, successively diminished in Grades 5 and 7.

10) Among the types of coordinate constructions within T-units, only those combining predicates significantly marked a difference between oral and written discourse. They were used at a higher rate in written than in oral expression in Grades 5 and 7.

11) Main clauses of the subject-verb pattern occurred significantly more often in speech than in writing in Grades 3 and 5, while the subject-verb-object pattern occurred at a significantly higher rate in writing than in speech at these grade levels. Main clauses with noun complements after linking verbs were used at a significantly higher rate in speech than in writing, while those in which the linking verbs are followed by predicate adjectives occurred significantly more frequently in writing than in speech.

12) Clause patterns that are grammatically incomplete were a little more frequent in writing than in speech in all three grades that produced writing samples, but not significantly so in any one of them. The difference was greatest in Grade 3.

Differences Correlated with Sex

1) No clear pattern of sex differences in production of garbles can be inferred from the data collected in this study.

2) The mean length of oral responses of boys was greater than that of oral responses of girls in all grades except Grade 5; differences in Grades 3 and 7 were statistically significant. Girls wrote longer compositions than boys did in Grades 3 and 5, while boys exceeded the girls in composition length in Grade 7; none of these differences was significant.

3) The average word-length of T-units was significantly greater in the oral expression of boys than of girls, when the grade range is considered as a whole. The largest (and significant) differences were found in kindergarten and in Grade 7. In writing, the average length of T-units produced by the girls was greater in Grades 3 and 5, but not in Grade 7; none of these differences was significant. Short T-units (those with less than nine words) were more frequent in the oral expression of girls in kindergarten, Grade 2, and Grade 7; they were more frequent in the writing of girls only in grade 7.

4) The sex differences in the mean numbers of sentence-combining transformations per T-unit exactly paralleled (in both speech and writing) the pattern observed in the word-length of T-units, except that they at no point reached the .05 level of statistical significance.

5) The incidence of coordinating conjunctions initial in T-units was higher in the speech of boys in kindergarten; in Grade 3 it was about the same for both sexes; in the other grades it was higher in the expression of girls. In writing, initial coordinating conjunctions were used more frequently by boys in Grades 3 and 5 but by girls in Grade 7.

6) Among the three general types of constructions produced by sentence-combining transformations (nominal, adverbial, and coordinate), fairly clear and consistent sex differences were observed in the use of nominals and coordinations. In speech, boys used the nominals with overall frequency significantly greater than that in the use by girls; in Grade 5, however, the relative frequency as between the sexes was reversed. In writing, the girls used these nominals much more frequently in Grades 3 and 5, but the use by boys in Grade 7 exceeded that of girls by an even greater margin. Boys used coordinate constructions within T-units

in speech consistently more often than did girls, and the difference attained s ‘stical significance in Grade 7. In writing, however, the boys ..d the coordinate constructions more frequently than girls only in Grades 5 and 7, and only the difference in Grade 5 had a magnitude worth remarking. Fluctuations rather than overall sex differences were found in the use of adverbial constructions, though the single significant difference produced by high incidence in the writing of fifth grade girls should be noted.

7) In the use of various subtypes of nominals produced by transformations, there were a few consistent patterns related to the sex differential, but differences at particular grade levels were usually not significant. Over all grades and considering speech and writing together, the more frequent use of prepositional phrases as noun modifiers by boys was significant, though girls employed such phrases more frequently than boys in speech in Grade 3 and in writing in Grade 5. Participles modifying nouns were consistently but nonsignificantly used more frequently by boys than by girls, with the sole exception of writing in Grade 3. Boys generally used noun clauses more frequently than girls in speech, and in kindergarten they used them almost four times as often. Girls used noun clauses twice as often as boys did in writing in Grades 3 and 5. In various grades, however, these general relationships were reversed, though by smaller amounts; across grades, the differences did not attain statistical significance.

8) Nominal transformations functioning as direct objects were used in speech more frequently by boys except in Grades 1 and 5, the most striking differences being seen in the language of kindergarten children and seventh graders. In writing, such nominals were used with significantly greater frequency by girls, and the difference was especially great in Grade 3. There was a large difference in favor of the boys in the use of nominal transformations functioning as objects of prepositions in seventh grade writing. Other differences between the sexes in their use of nominal transformations performing various syntactic functions were generally small and inconsistent.

9) There were no generally significant sex differences in the use of subtypes of adverbial constructions, but two items must be noted as out of line with the general pattern of increases from grade to grade. In speech, the use of adverbial clauses by girls in Grade 2 fell below their level of use in kindergarten and was little more

than half as great as the use of such clauses by second grade boys. In writing, the use of adverbial clauses by girls in Grade 5 was almost twice as great as that by boys, and it was considerably greater than that by either boys or girls in Grade 7.

10) Boys used coordinate nominals twice as often as girls in kindergarten, but no further marked difference between the sexes in the use of such nominals was observed until the seventh grade, where the higher incidence in the expression of boys was once more notable. Also in speech, the greater use of coordinate predicates by boys was significant. In writing, though girls used coordinate predicates (nonsignificantly) more frequently in Grade 3, the use by boys outran that by girls in Grades 5 and 7, and the difference in Grade 5 was particularly notable.

11) Except in Grade 5, girls consistently used the subject-verb sentence pattern in speech more frequently than did boys, but the differences were small. Again, except in Grade 5, boys consistently used the subject-verb-predicate nominal pattern in speech more frequently than girls did, and the differences were fairly large in kindergarten and Grade 7. Other sex differences in the use of grammatically complete sentence patterns were not remarkable.

12) In both speech and writing both sexes consistently reduced their use of grammatically incomplete sentence patterns, but the points at which the greatest reductions came were different. In speech, the partial patterns occurred about as often in the expression of boys as of girls in both kindergarten and Grade 7. In the language of girls, however, the most dramatic drop in incidence came in Grade 1, while in that of boys the large reductions came in Grades 3 and 5. In writing, the frequency rate of partials in compositions of girls in Grade 3 was about 60 percent higher than that in compositions of boys in the same grade. Girls in Grade 5, however, cut their rate of use of such clauses to less than half what it had been in Grade 3, while boys did not reduce their use of partials until Grade 7. As in speech, the overall occurrences in writing amounted to about the same for both sexes.

CHAPTER IV

GENERAL CONCLUSIONS AND IMPLICATIONS

Several considerations ought to be kept in mind when findings of this investigation are applied to the questions that motivated it, or when further implications are drawn from those findings.

The language samples analyzed may be supposed comparable, for they were produced under similar conditions as responses to moving-picture cartoon versions of Aesop's fables simple enough and lively enough to be followed with interest by even the youngest children. It is not, however, certain that the 180 white, middle class children in six grade groups in Murfreesboro, Tennessee, spoke and wrote about those films in March, 1965, in language just like what would be used in such discussion by other children at other times and places.

In the second place, this study did not by any means deal with all aspects of language that might be of interest, or with the full range of grammatical structures and functions. Except for main-clause patterns, the structures and functions selected for attention were only those taken to be dependent on sentence-combining transformations.

It should be remembered, too, that though the children in Murfreesboro were encouraged to interpret and support their interpretations of two stories seen silently enacted, by far the largest part of all responses simply recounted the stories as they had been understood. Language used by children for different purposes would very likely display somewhat different patterns. General representativeness of the behavior of subjects of this study is at various points suggested by remarkable parallels with that reported by other investigators of the language of other children under other circumstances. Nevertheless, it is with due tentativeness that, on the basis of observations made in the course of this research, answers to some broad questions are offered.

Are Measurable Differences to Be Found in Grammatical Structures Used by Children at Various Age-Grade Levels?

Taken in its simplest possible sense, the first question motivating this study is gratuitous. Numerous researchers have given quantitative accounts of syntactic differences in language used by children at varying chronological and educational stages. The problem

was whether or not the particular series of analyses contemplated would reveal significant differences among the particular groups of children to be studied. So understood, the question was a real one, and it has been affirmatively answered.

Implied in the question was concern not only with the nature of any differences that could be identified, but also with common features of children's syntax that might be disclosed where variance was not found. Special importance, indeed, may be attached to the fact that little diversity was observed in relative frequencies of grammatically complete basic structure patterns of main clauses. The eleven patterns identified in the language samples (see Tables 23 and 24) were all used in the speech of kindergarten children, although six of them occurred very infrequently. Two of the rarer ones (that involving an object complement and that in which an initial abverb is followed by the inverted order of verb and subject) were sometimes missing in oral responses in later grades, but all the patterns were used by seventh graders at about the same rate as they had been used in kindergarten—with one exception. The one significant difference was a 60 percent reduction in use of nominal complements following linking verbs. This pattern, incidently, was used still less frequently in Grades 2, 3, and 5 than in Grade 7. In writing, all eleven patterns were used, at least occasionally, in each of the three grades studied. The only three significant variations in frequencies all related to the commonest clause structures. It is probably more revealing to note that there was a steady and significant reduction in incidence of grammatically incomplete patterns in speech from kindergarten through Grade 7, and a significant reduction in their use in writing in Grade 5.

The suggested generalization that relative uses of basic structures in main clauses do not vary much through the elementary school years is not necessarily invalidated by reports of differential employment of "sentence patterns" that have been made by certain other investigators. Strickland (1962), Hocker (1963), and Riling (1965) distinguished such patterns not only by reference to basic structure but also to various types and positions of adverbial modifiers and to connections between clauses. Sam and Stine (1965) tabulated total occurrences of six structure patterns such as are dealt with in this study, and they reported large increases in the use of four of them in fifth and sixth grade writing; but they did not take account of the fact that children in successive grades wrote

longer compositions. Loban, who identified "patterns of communication units" roughly comparable to main clause structures discussed here, computed their use in percentages of total amounts of oral language produced, but his reports (1961, 1963, 1964) are almost wholly confined to comparisons of behavior of the most and least linguistically proficient children in the various grades. Nevertheless, it is pertinent to cite his conclusion (1963, p. 84) that, except in uses of linking verbs and in general decreases of incomplete structures, "differences in structural patterns are not notable." He remarked, "*Not pattern but what is done to achieve flexibility within the pattern* proves to be a measure of effectiveness and control of language. . . ."

Numerous notable grade level differences *were* found in the course of the present study in proportional uses of syntactic structures describable as formed from sentence-combining transformations. To speak first of one of the less impressive, after a constant rise in the rate of main-clause coordination in speech through Grade 5, the trend was significantly reversed by the seventh graders. Seventh graders also employed such coordination in writing less frequently than did either fifth or third graders. What is probably more important, in both speech and writing there were significant overall increases across the grade spans in the use of the whole classes of transformation-produced nominals and adverbials. The overall increase in use of the whole class of coordinations within T-units was also significant in speech, though not in writing.

The statements just made do not imply that notable increases were found in the use of all construction types distinguished within the three general classes. Nor do they mean that the classes as wholes were more frequently represented in each successive grade, though that was true in all but four instances. Increments were not equal in all grades where they appeared, either. Statistically significant increases in use of the nominals and adverbials (as whole classes) occurred in speech only in Grades 1 and 7; such increases were found in writing in both fifth and seventh grades. Coordinations within T-units increased significantly in seventh grade speech; in writing, their increase in Grade 5 was significant, but the rate of their use was reduced by seventh graders.

Among eighteen specific kinds of structures comprised in the three general categories, some were used little more in one grade than another, and some were used less frequently in more advanced

grades. Three (the gerund phrase and nouns modified by adverbs and by infinitive phrases) were used infrequently and with little variation over the grade spans represented by speech and writing samples. Noun clauses were a little less often employed in the writing of fifth and seventh graders than in that of third graders. Relative clauses were used in speech at a higher rate by kindergarten children than by any other grade group. There were wide fluctuations in the incidence of infinitives with subjects in speech, but fifth and seventh graders used them a little less frequently than kindergarten children did.

With these exceptions, however, the specific constructions identified showed marked overall increases in use in speech and writing across the grade ranges. The greatest and most frequently significant increases in speech occurred in Grades 1 and 7; in writing, increases were common in both the later grades but were most impressive in Grade 5.

Greatest overall increases and most frequently significant increments from grade level to adjacent grade level were found in the use of adverbial infinitives, sentence adverbials, coordinations within T-units, and modifications of nouns by adjectives, participles, and prepositional phrases. In the theory of transformational grammar, all these constructions are explained as being produced by application of deletion rules. They may be contrasted with constructions that require transformational substitutions or additions. Relative clauses, as we have already noted, were used in speech most frequently by kindergarten children, though in writing they occurred least often in the papers of third graders. Noun clauses were increased modestly in speech from kindergarten through the seventh grade, but they were used in writing most frequently by third graders. Though adverbial clauses were used twice as frequently in seventh grade speech as in kindergarten and almost twice as often in seventh grade writing as in third grade writing, at no point was there a significant increase from one grade to another just above it. To the group of transformations requiring addition and possibly substitution, but not deletion, must be added the coordination of main clauses. It has been shown that the rate of use of such coordination was increasingly high through the fifth grade, but that it was significantly reduced in Grade 7.

Is It Possible to Define a Sequence in Children's Acquisition of a Productive Repertory of Syntactic Structures?

To speak of children's acquiring a syntactic repertory does not here imply any notion that they mechanically accumulate a structure-hoard. Without concern, at the moment, about how children come by their competence to use syntactic resources in speech and writing, the question asked is simply whether we may discover a characteristic order in the development of actual uses of those resources. Do some types and functions of structures typically appear earlier and others later?

A general kind of sequential development in productive command of syntax has been indicated by studies of very young children. Individual rates of advancement vary, but the order appears remarkably constant. Brown and Fraser (1964), for example, found that among thirteen two-year-olds they studied, use of *be* in progressive verb phrases was delayed; it never appeared in speech of children whose utterances had a mean length of less than 3.2 morphemes, but was used by all the others. Use of *can* or *will* as modal auxiliaries developed still later, and only when utterances had reached a mean length of at least 3.5 morphemes. Lenneberg (1964) has also shown that among single-base transformations, the passive presents particular difficulty to immature minds; it is always late in appearing in children's speech. Menyuk (1961, 1963a, 1964b) has identified some sequential trends in syntax of children from nursery school age to first grade. Can further evidence be found relating to order in the development of older children?

This investigation offers no simple, direct answer to that question. If some item of syntax had been found absent in the speech of younger children but present in increasingly frequent use in more advanced grades, it would have seemed evident that it was a characteristically later acquisition. No such instance was observed. Among the thirty-nine specific structures and functions identified for attention, the three completely missing in kindergarten speech were not much used by older children, either. We could argue that these items (noun modification by an adverb and transformation-produced constructions used as indirect objects and object complements) had not yet been firmly incorporated into repertories of even the seventh graders. It seems more probable that the situation the children responded to furnished little opportunity for

their use--or, indeed, that expression generally makes little use of them.

An inference, however, may possibly be drawn from the fact that some items were used much more frequently in kindergarten than in the later grades. It can be reasoned that these features were early incorporated into the children's expression patterns and were partially displaced by others later added. Items in question were the relative clause, noun modification by an infinitive phrase, the main clause in which an adverb is followed by inverted order of verb and subject, the main clause in which a linking verb is followed by a nominal complement, and the transformation-produced nominal functioning as subject complement. To this list, as an obviously early acquisition, we may add main-clause coordination, which was reduced in frequency only in the seventh grade.

On the other hand, there was a group of items that appeared more than sporadically in kindergarten speech but were used from about three to ten times oftener by seventh graders. At various levels, there were significant increments in their use. These would appear good candidates for identification as generally later acquisitions. They were noun modification by a participle or participial phrase, the gerund phrase, the adverbial infinitive, the sentence adverbial, the coordinated predicate, and the transformation-produced nominal functioning as object of a preposition.

Theoretically, it seems reasonable to suppose that these constructions (unless acquired as formulas) would be mastered relatively late. Transformational grammar derives them all by application of deletion rules, and some of them indirectly from their sources by way of strings that could more directly yield subordinate clauses. Thus, *The man wearing a coat . . .* may be more difficult than *The man who was wearing a coat . . .*, and *A bird in the tree . . .* more difficult than *A bird that was in the tree . . . .* Noting that noun clauses did not vary much in frequency after the first grade, while participial modifiers of nouns were used by seventh graders three times as often in speech and nearly eight times as often in writing as they were used by kindergarten children, we may contend that such clauses (The dove saw *that the ant was drowning*) are easier to manage and earlier added to the child's repertory than is the reduction of them to a single participial modifier (The dove saw the ant *drowning*). And common observation supports the supposition that conjunction of two independent clauses as

wholes is easier for children than deletion of the subject of one and coordination of the predicates. All such argument, however, goes beyond the data collected in this study.

Inconclusiveness of the findings bearing on sequential enlargement of syntactic repertories may indicate that study of individual language production would be more fruitful than a cross-sectional investigation.

Do Children Develop Productive Control of Syntax Gradually, or Do They Go Through Stages of Relatively Rapid Development?

The data collected and analyzed in this study indicate that there may, indeed, be particular periods when children's expansion of their use of syntactic resources proceeds at a relatively rapid pace. Among the children observed, such periods in oral expression were located at the extremes of the grade range—the time spans between kindergarten and the end of the first grade, and between the end of the fifth grade and the end of the seventh. Progress, of course, was made between Grade 1 and the end of Grade 5, but it appears to have been slower and fluctuating in rate. In writing, development was impressive in both of the higher grades, but the overall expansion was more striking in Grade 5.

In first grade speech there were numerous increments in structures and functions dependent on sentence-combining transformations that may reasonably be supposed to reflect syntactic control. Increases large enough to be statistically significant were observed in first graders' use of two of the general classes of constructions studied: nominals and adverbials. Significant increments were found also in the use of adverbial clauses, infinitives with subjects, and nominals functioning as direct objects.

Increments of such magnitude were not again so frequently discovered in the speech of any grade group before the seventh. Seventh graders showed very large gains over fifth graders in the use of all three of the general classes of constructions, and also in the use of noun clauses, noun modification by means of adjectives and prepositional phrases, adverbial clauses, sentence adverbials, coordinate nominals, and coordinate predicates. Further, they notably exceeded fifth graders in the use of transformation-produced nominals functioning as subjects, direct objects, and objects of prepositions.

It is certainly not assumed here that multiplication of uses of any particular syntactic structures or functions is always a mark of

language control. Naturally, effective language varies with circumstances; appropriateness depends on such factors as subject, context, purpose, and anticipated listeners or readers. In this report, it has only been supposed that when large groups of children respond under similar circumstances arranged to give them considerable scope for expression, if older groups more frequently employ features of syntax such as have been mentioned in the last two paragraphs, they demonstrate (as groups) their firmer command of resources of the language. Admittedly, the supposition is related to some subjective notions about adult skill in handling language. Those notions also suggest that restraint in the use of some syntactic possibilities is a demonstration of control.

In the first grade, development of control may be seen in reduced frequency of grammatically incomplete clause patterns, though similar decreases were somewhat greater in Grades 2 and 3. First graders also reduced by about 40 percent the use of main-clause patterns in which predicate nominals follow linking verbs. It is argued here that this fact reflects growth toward maturity, for the simple pattern in question serves the very elementary purposes of indicating identification or equation. (Examples: *It was an ant. He was a hunter. It was a rainy day.*) This pattern was used still less frequently in later grades than in Grade 1. Another, though indirect, evidence of first graders' marked growth in manipulating syntax is their more than 10 percent reduction of the proportion of clauses containing less than nine words. No other equally great reduction was found in speech until the seventh grade.

Besides the decrease in the proportion of short T-units that has just been mentioned, the speech of seventh graders was distinguished by an equally great reduction in the incidence of main-clause coordination; it was the only such reduction observed.

In writing, the syntax of third graders could be judged inferior to that of the older children at almost every point at which analysis was applied. It seems possible to conclude, also, that the advancement gap was greater between Grade 5 and Grade 3 than between Grade 7 and Grade 5. That judgment is based in part on the more impressive fifth grade decrements in incomplete clauses and short T-units. It is also supported by the facts that, though significant increments in the whole classes of transformation-produced nominals and adverbials occurred in both grades, there were much greater fifth than seventh grade increases in the use of genitive forms,

relative clauses, adverbial clauses, and complex structures functioning as direct objects.

In fifth grade writing, there were also significant increments in the use of all types of coordinations within T-units, by contrast with a small general reduction in their use by seventh graders. The handling of such coordinations, however, is not here interpreted as showing differential development of writing skill in the two grades. It seems more likely, as earlier discussion suggested, that by about the fifth or sixth grade, children exploit such coordinations in writing at a rate they will not exceed in later years.

Are There Significant Differences in Children's Handling of Syntax in Speech and Writing?

Distinct and dramatic differences were found in the syntax of speech and writing in all three grades from which writing samples were collected. On almost all counts, it was clear that where notable differences appeared in Grade 3 (and there were many), they indicated weaker control in writing. The one important exception was in coordinations of main clauses, which occurred more than three times as often in speech as in writing.

Unexpectedly uniform evidence, however, showed that advances in the control of syntax in Grades 5 and 7 were accelerated in writing far beyond those reflected in speech. The crossover in the relative degrees of skill in the two modes of expression was marked in the later grades by a lower proportion of short T-units (those less than nine words in length); by significantly greater use of the whole classes of transformation-produced nominals, adverbials, and coordinations within T-units; by notably more frequent use of seven of the twelve specific types of nominal structures identified; by greater use of adverbial clauses and adverbial infinitives; and by much greater use of coordinate predicates, particularly in Grade 5. It may also be reflected in the lower incidence in writing of clause patterns in which linking verbs are followed by nominal complements.

It seems quite possible that general trends described here may be characteristic among school children. Lull (1929), on the basis of quite different, essentially subjective observations, reported that children in Kansas began at the 5B grade level to write better than they spoke. Harrell (1957, p. 70) concluded that Minnesota children aged 9 through 15 demonstrated greater control of syntax in writing than in speech on almost all the measures he applied.

Do Boys and Girls Differ Significantly in the Use of Syntactic Structures at Various Grade Levels?

Numerous differences were observed in syntactic structures and functions in the language of boys and girls at the six grade levels studied, and a good many of them were large enough to be statistically significant. In speech, however, the differences so fluctuated that no distinct, consistent pattern was indicated. About the only generalization warranted is that when the honors were not even, they more often favored the boys. Taken as a whole, the findings of this investigation do not support the widely held notion, formulated by McCarthy (1954, p. 577), that among American white children the development of girls characteristically outruns that of boys "in nearly all aspects of language." Absence of clear, consistent sex distinctions can also be noted in recent reports by Templin (1957), Harrell (1957), Strickland (1962), Loban (1963), Menyuk (1961, 1963b), and Riling (1965).

In writing, however, girls in Grades 3 and 5 appeared to be clearly superior to the boys. Their greater writing skill would seem to be reflected in their less frequent coordination of main clauses, the smaller proportion of their T-units containing fewer than nine words, and their greater use of transformation-produced nominals and adverbials (considered as whole classes). Among specific structures, noun clauses were used with significantly greater frequency by girls in both Grade 3 and Grade 5; adverbial clauses were used oftener by girls in both grades, and significantly so in Grade 5; and coordinate predicates had notably greater use by girls in Grade 3. All these facts suggest that girls more readily adapt themselves to the practice of writing than boys do. The suggestion is reinforced by various data offered in the study by Hunt (1965) of compositions written in Grades 4, 8, and 12.

In the seventh grade writing reported on here, however, the relative positions of the sexes were clearly reversed on the scales taken to indicate syntactic skill. Differences almost uniformly favored the boys; some of the most impressive are seen in the much greater use of transformation-produced nominals and in the considerably less frequent use of short T-units and main-clause coordination. The comparison of the sexes in Grade 7, of course, should take into account the fact that the mean age of the boys was seven months greater than that of the girls.

Is There a Simple Objective Measure That Has Special Claim to Validity as an Indicator of Children's Development of Syntactic Control?

Both casual observation and careful studies, many of them reviewed by McCarthy (1954), indicate that mere volubility is a fair measure of preschool children's development of a productive mastery of their native language. Observation and common sense, on the other hand, prevent us from supposing that it is a very meaningful gauge of control of syntax by adult speakers and writers. The present study confirms earlier comparable reports in showing that up through the elementary grades there is a general, positive correlation between age-grade advancement and increasing word-length of total responses to a particular stimulus situation. Does this mean that for such children volubility is still a useful index to the degree of linguistic maturity attained?

This study, in fact, appears to justify an intuitive reluctance to regard a gross word-count very seriously as a measure of language mastery in school age children. Quite apart from such matters as appropriateness of word choice, pertinency of remarks, and general organization, it shows that development of power to manipulate syntactic structures is very imperfectly reflected in comparisons of mean length of total responses at various grade levels. Evidently, development of syntactic control may be most clearly marked at stages where increases in total wordage are least notable, and *vice versa*. If this is true of groups of children, it is no doubt more conspicuously true of individuals. The length of total response is probably a function of complex interaction of many factors, among which control of syntax may be one, but one of quite limited explanatory significance.

The claims of clause length as an easily observed, objective indicator of development in syntactic control have not been explored in this investigation. Objections to the validity of length of "sentences" or "phonological units" as measures of such development, however, were inferentially supported by observation of very high rates of main-clause coordination in both speech and writing. Those rates increased regularly up to the seventh grade, and even there they were (by any conceivable standards of educated adult usage) excessive. Whatever ordinary practice of identifying "sentences" might be adopted, it can surely be presumed that such coordination as

has been described here would adversely affect sentence length as an index of syntactic skills.

Various calculations based on relative frequencies of subordinate clauses in children's language have long been favored devices for gauging development toward maturity in use of syntactic resources. That they have some discriminative power has been repeatedly demonstrated. Findings of this study, however, raise a question about their sensitiveness as measures of growth. Nominal, adjectival, and adverbial clauses were all used quite often by kindergarten children, and none of the types was employed in speech in any grade at a rate significantly higher than in the grade below. Relative clauses, in fact, were used most frequently in kindergarten. In writing, there were no significant increases in the use of noun clauses; significant increments in adverbial and relative clauses occurred only in Grade 5. If the older children had improved their command of syntax, they did not show it very clearly in expanded use of subordinate clauses.

It has been pointed out that with advances in grade, the children often increased significantly their use of certain types of structures that can be identified as transformations involving deletion rules. It might reasonably be proposed that growing power to manipulate syntax is better measured by relative uses of such structures than by subordination indexes. Better still, we may argue, is a computation of the relative frequency of all sentence-combining transformations, including subordinate clauses–but excluding main-clause coordination. Such a measure is objective, and there appear to be good grounds for believing it to have a high degree of validity. It is, however, far from being simple and easily applied.

The readily performed calculation of mean lengths of T-units, however, appears to give a close approximation to results of the more complicated accounting of sentence-combining transformations. Differential lengthening of T-units in successive grades studied in this research reflected varying degrees of expansions in the exploitation of syntactic resources. Comparisons of subgroup means of T-unit length also indexed just such distinctions between the speech and the writing of boys and of girls as were observed in the more detailed analyses.

This investigation supports the finding by Hunt (1964, 1965) that when fairly extensive samples of children's language are obtained, the mean length of T-units has special claim to consideration

as a simple, objective, valid indicator of development in syntactic control. Confidence in its usefulness when applied to the language of children is enhanced by evidence that even high school students typically write in T-units shorter than those produced by skilled adults. Hunt (1965, p. 57) has reported a sampling of articles in *Harper's* and *The Atlantic* in which T-units were 40 percent longer than those in the twelfth grade writing he studied.

Some Implications for Teaching and for Further Research

Unlike earlier reports on children's language, but confirming more recent accounts, this study found in speech no evidence of linguistic superiority of girls over boys at comparable ages. It seems possible that changes in social, cultural, and educational environments have reduced differential behavior of the sexes. If there are English teachers who assume that they must naturally expect less language maturity in boys than in girls in the same grade, they may need to reexamine their assumption.

Judging both by syntactic features and volubility, however, girls in Grades 3 and 5 appeared to be a good deal more adept in writing than the boys were. If the findings of this study are generalizable, they raise the question of why girls acquire writing skill more rapidly. Is their earlier adaptation to writing related to finer motor adjustment, or do the school's methods better fit them? Could, or should, special planning be given to the initiation of boys into the practice of writing? These questions probably deserve attention.

As Loban (1963, p. 87) has pointed out, earlier research (including his own) has not resulted in identification of clearly defined stages of development in language proficiency in the elementary school years. Techniques of analysis employed in this study have led to the observation that in the population sampled, the first grade year was one of rapid and extensive development in exploiting language structures. Then, from the end of Grade 1 to the end of Grade 5, growth in control of syntax in speech proceeded at a much slower pace, though advances in writing were very considerable by the end of the fifth grade. Approaching adolescence, the children apparently made most important advances in the handling of oral expression; their growth toward physical maturity was accompanied by a corresponding development in language structure.

If the periods of striking development identified here are in-

deed stages of natural growth, it would seem appropriate to take advantage of them. Teaching materials and techniques designed to heighten awareness of the structural resources of the language might be particularly effective at those stages.

On the other hand, it is not impossible that the generally unimpressive progress in syntactic control in the middle grades may be in part a function of the educational program during those years. Would more carefully planned and efficiently managed programs in the school accelerate development of syntactic mastery in those grades? This is a question that calls for experimental investigation. Some other questions demanding research are these: Does deliberate instruction at any level contribute a great deal to mastery of syntax, or does the child just absorb a functioning knowledge of language practices from his general environment? If deliberate instruction does result in increased facility with language, what materials and methods are most efficient and effective? Is the gap between development of syntactic control in speech and writing in the upper grades desirable? If not, is it possible to close it by accelerating growth toward mastery in speech?

The present study provides valuable information about types of grammatical patterns and constructions that are used often and with increasing frequency by children as they advance in school, but perhaps equally valuable is its evidence of infrequent uses. Relative to the amount of speech and writing analyzed, the variety of sentence patterns and the variety of constructions filling the pattern slots were fairly restricted at all grade levels. The fact that at each level, however, most of the possible patterns and constructions did occur in the language of some of the children suggests that it is reasonable to suppose they would have been useful to others and that their use is within the potential capacity of elementary school children.

We need, of course, to know a great deal more than we do about the hierarchy of difficulty involved in both the production and interpretation of various grammatical structures. Results of penetrating research on this subject could surely improve the designing of instructional materials to develop systematically the child's ability to manipulate structures and thus to increase flexibility and power in expression. Naturally, the development of judgment about what is appropriate ought to accompany growth in ability to manipulate syntax. It is also obvious that concern with structure

must not be separated from concern with other aspects of language growth, but improvement in control of syntax is certainly a crucial interest of English teachers.

Fuller understanding of the nature and implications of transformational grammar will probably be a valuable aid to the perception of problems and possibilities of English teaching. That grammar generates insights into language structure not easily accessible by other means; it also suggests techniques of language analysis that seem efficient and productive.

Such techniques have been applied within a limited scope in this investigation. Their application has led to at least tentative answers to a number of questions, but it has left many others untouched. It has not, for example, explored stylistic differences between oral and written uses of language. Very probably, methods used in this study could be further refined and applied to many other aspects of language behavior. Similar research conducted at the high school and college levels might also have an important bearing on language instruction.

REFERENCES

Anastasi, Anne, and Rita D'Angelo. 1952. "A Comparison of Negro and White Preschool Children in Language Development and Goodenough Draw-a-Man IQ," *The Pedagogical Seminary and Journal of Genetic Psychology*, 81: Second Half (December), 147-165.

Anderson, John E. 1937. "An Evaluation of Various Indices of Linguistic Development," *Child Development*, 8:1 (March), 62-68.

Bear, Mata V. 1939. "Children's Growth in the Use of Written Language," *Elementary English Review*, 16:7 (December), 312-319.

Brown, Roger, and Colin Fraser. 1964. "The Acquisition of Syntax," *Monographs of the Society for Research in Child Development*, 29:1, 43-79.

Bushnell, Paul P. 1930. *An Analytical Contrast of Oral with Written English*, Teachers College Contributions to Education, No. 451. New York: Columbia Teachers College.

Carroll, John B. 1960. "Language Development in Children" in *Encyclopedia of Educational Research*, edited by Chester W. Harris, pp. 744-752. New York: Macmillan.

Chomsky, Noam A. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.

Chomsky, Noam A. 1957. *Syntactic Structures*. 's-Gravenhage: Mouton and Co.

Chomsky, Noam A. 1962. "A Transformational Approach to Syntax," in *Third Texas Conference on Problems of Linguistic Analysis of English*, edited by Archibald A. Hill, pp. 124-158. Austin: University of Texas Press.

Davis, Edith A. 1937. *The Development of Linguistic Skill in Twins, Singletons with Siblings, and Only Children from Age Five to Ten Years*. Institute of Child Welfare Monograph Series, No. 14. Minneapolis: University of Minnesota Press.

Davis, Edith A. 1941. "The Location of the Subordinate Clause in Oral and Written Language," *Child Development*, 12:4 (December), 333-338.

Day, Ella J. 1932. "The Development of Language in Twins: I. A Comparison of Twins and Single Children," *Child Development*, 3:3 (September), 179-199.

Ervin, Susan M., and W. R. Miller. 1963. "Language Development," in *Child Psychology*, Sixty-second Yearbook, Part I, National Society for the Study of Education, edited by Harold W. Stevenson, *et al.*, pp. 108-143. Chicago: University of Chicago Press.

Hahn, Elise. 1948. "An Analysis of the Content and Form of the Speech of First Grade Children," *Quarterly Journal of Speech*, 34 (October), 361-366.

Harrell, Lester E., Jr. 1957. "A Comparison of Oral and Written Language in School-Age Children," *Monographs of the Society for Research in Child Development*, 22:3.

Heider, F. K. and G. M. Heider. 1940. "A Comparison of Sentence Structure of Deaf and Hearing Children," *Psychological Monographs*, 52:1, 42-103.

Hocker, Mary Elsa. 1963. "Reading Materials for Children Based on Their Language Patterns of Syntax, Vocabulary, and Interests." Unpublished Master's thesis, University of Arizona.

Hoppes, William C. 1934. "Considerations in the Development of Children's Language," *Elementary English Review*, 11:3 (March), 66-70.

Hunt, Kellogg W. 1964. *Differences in Grammatical Structures Written at Three Grade Levels, the Structures to Be Analyzed by Transformational Methods.* Report to the U.S. Office of Education, Cooperative Research Project No. 1998. Tallahassee, Florida.

Hunt, Kellogg W. 1965. *Grammatical Structures Written at Three Grade Levels.* National Council of Teachers of English Research Report No. 3. Champaign, Ill.: National Council of Teachers of English.

LaBrant, Lou. 1933. "A Study of Certain Language Developments of Children in Grades 4-12 Inclusive," *Genetic Psychology Monographs*, 14:4 (November), 387-491.

Lees, Robert B. 1960. "The Grammar of English Nominalizations," *International Journal of American Linguistics*, 26:3, Part 2.

Lees, Robert B. 1961. "Grammatical Analysis of the English Comparative Construction," *Word*, 17:2 (August), 171-185.

Lenneberg, Eric. 1964. "Speech as a Motor Skill with Special Reference to Nonaphasic Disorders," *Monographs of the Society for Research in Child Development*, 29:1, 115-127.

Lindquist, E. F. 1953. *Design and Analysis of Experiments in Psychology and Education.* Boston: Houghton Mifflin.

Loban, Walter D. 1964. *Language Ability: Grades Seven, Eight, and Nine.* Report to the U.S. Office of Education, Cooperative Research Project No. 1131. Berkeley, California.

Loban, Walter D. 1961. *Language Ability in the Middle Grades of the Elementary School.* Report to the U.S. Office of Education, Contract No. SAE 7287. Berkeley, California.

Loban, Walter D. 1963. *The Language of Elementary School Children.* National Council of Teachers of English Research Report No. 1. Champaign, Ill.: National Council of Teachers of English.

Lull, H. C. 1929. "The Speaking and Writing Abilities of Intermediate Grade Pupils," *Journal of Educational Research,* 20:1 (June), 73-77.

McCarthy, Dorothea A. 1954. "Language Development in Children," in *Manual of Child Psychology,* second ed., edited by Leonard Carmichael, pp. 492-630. New York: John Wiley and Sons.

McCarthy, Dorothea A. 1930. *Language Development of the Preschool Child.* Institute of Child Welfare Monograph Series, No. 4. Minneapolis: University of Minnesota Press.

Menyuk, Paula. 1964a. "Alternation of Rules in Children's Grammar," *Journal of Verbal Learning and Verbal Behavior,* 3:6 (December), 480-488.

Menyuk, Paula. 1963a. "A Preliminary Evaluation of Grammatical Capacity in Children," *Journal of Verbal Learning and Verbal Behavior,* 2:5-6 (December), 429-439.

Menyuk, Paula. 1964b. "Syntactic Rules Used by Children from Preschool Through First Grade," *Child Development,* 35:2 (June), 533-546.

Menyuk, Paula. 1961. "Syntactic Structures in the Language of Children." Unpublished Doctoral dissertation, Boston University.

Menyuk, Paula. 1963b. "Syntactic Structures in the Language of Children," *Child Development,* 34:2 (June), 407-422.

Riling, Mildred E. 1965. *Oral and Written Language of Children in Grades 4 and 6 Compared with the Language of Their Textbooks.* Report to the U.S. Office of Education, Cooperative Research Project No. 2410. Durant, Oklahoma.

Roberts, Paul. 1964. *English Syntax*. New York: Harcourt, Brace & World.

Sam, N. H., and E. S. Stine. 1965. *Structural Analysis of the Written Composition of Intermediate Grade Children*. Report to the U.S. Office of Education, Cooperative Research Project No. S-057. Bethlehem, Pennsylvania.

Shire, Sister Mary Louise. 1945. "The Relation of Certain Linguistic Factors to Reading Achievement in First-Grade Children." Unpublished Doctoral dissertation, Fordham University.

Slobin, Dan I. 1963. "Grammatical Transformations and Sentence Comprehension in Childhood and Adulthood." Unpublished Doctoral dissertation, Harvard University.

Smith, Madorah E. 1926. "An Investigation of the Development of the Sentence and the Extent of Vocabulary in Young Children," *Child Welfare*, 3:5. Iowa City: University of Iowa.

Stormzand, Michael, and M. V. O'Shea. 1924. *How Much English Grammar?* Baltimore: Warwick and York.

Strang, Ruth, and Mary Elsa Hocker. 1965. "First Grade Children's Language Patterns," *Elementary English*, 42:1 (January), 38-41.

Strickland, Ruth G. 1962. *The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children*. Bulletin of the School of Education, Indiana University, 38:4 (July). Bloomington: Indiana University.

Templin, Mildred. 1957. *Certain Language Skills in Children: Their Development and Interrelationships*. Institute of Child Welfare Monograph Series, No. 26. Minneapolis: University of Minnesota Press.

Watts, A. F. 1948. *The Language and Mental Development of Children*. Boston: D. C. Heath.

APPENDIX A

Schedules of Instructions Followed by Interviewers

(Each interview was conducted immediately after the child had seen one of the films.)

I. "The Ant and the Dove"

1. After brief conversation to put the child at ease, turn the recorder on.
2. Record the child's code number on the tape, so that his speech sample can be identified.
3. Ask the child to tell in his own words the story of the ant and the dove.
4. When he has finished telling the story, ask the child: "Do you think this story shows that one good turn deserves another?" If his answer is *yes*, say: "Explain why you think so." If his answer is *no*, say: "Explain why you do not think so."
5. (For third, fifth, and seventh graders only.) After giving the child a pencil, extra paper, and the question sheet, say: "Now, I want you to write the story and your answers to the questions I have asked you about it." Read each item to him and be sure that he understands what he is expected to do.

II. "The North Wind and the Sun"

1. After putting the child at ease, turn the recorder on.
2. Record the child's code number, so that his speech sample can be identified.
3. Ask the child to tell in his own words the story of the North Wind and the Sun.
4. When he has finished telling the story, say: "Which do you think is more powerful, the North Wind or the Sun?"
5. After he answers the question, say: "Why do you think so?"
6. Then say to the child: "This story is supposed to show that you can sometimes do more by being gentle than you can by using force. Do you agree or disagree with the idea that gentleness is sometimes better than force?"
7. Ask him to explain why he agrees or disagrees, and ask him to give examples from his experience showing that gentleness is more effective than force, or *vice versa*. These examples could

come from experiences in his family, his neighborhood, or his school. Encourage the child to talk freely and at length.

8. (For third, fifth, and seventh graders only.) After giving the child a pencil, extra paper, and the question sheet, say: "Now, I want you to write the story and your answers to the questions I have asked you about it." Read each item to him and be sure that he understands what he is expected to do.

APPENDIX B

Examples of Typescripts of Oral and Written Discourse with Marking of Material to Be Excluded from Further Processing

I – Interviewer

C – Child

Subject: A male pupil in Grade 3, aged 8 years, 7 months.

I. Oral Discussion of "The North Wind and the Sun"

[I: may I have your code number

C: 316

I: now in your own words tell me the story of the north wind and the sun]

C: well one day uh the north wind and the sun were uh the north wind came along and uh uh asked the sun to for them to have a test to see which one uh was the strongest and most powerfulest so uh uh uh they saw they looked down in the valley and they saw a man coming and the uh uh the wind said we'll uh test to see who can make the man take off uh most of his uh jackets and coats and stuff and so they started and the wind went first and kept on blowing and he blew down a couple of trees and blew off a house top and blew and he made the frog have to jump in the water and the waves started blowing and after his turn the sun's turn came it uh made all uh some plants come up the people were build uh putting back on their roofs and uh then it shined down on the man and he threw off his coats and uh coats and stuff and uh he uh threw them on this tree and hang them on a tree limb and hanged em up up and uh they lived happily ever after that's all I can remember

[I: which do you think is the more powerful the north wind or the sun

C: the sun

I: why do you think so]

C: because it uh made the man take off his coats and stuff

[I: all right this story is supposed to show that you can sometimes do more by being gentle than you can by force do you agree or disagree with the idea that gentleness is sometimes better than force]

C: uh it is gentleness is better

[I: will you explain why you agree and give me an example from your experience showing that gentleness is more effective than force

now these experiences uh may come from your home or your neighborhood or school]

C: what do you mean tell why I think it's better

[I: yes uh uh maybe you have had some experience by being gentle and finding that you can get more out of a person or you get along better by being gentle rather than using force just give me some example that uh you have had along that line]

C: well uh you want me to tell about me and my friend or something like that

[I: that's right]

C: well uh one day my friend and me were having a race he asked me to have a race and see which one was the fastest and whoever was the fastest if I beat he had to give me a nickel or if he beat I had to give him a nickel and so we did it and uh he said that he could probably beat me because he had beat lots of other kids and he ran down there and said ah come on scardy you don't want to race and then he went down there and he got beat and I told him just not to give me the nickel cause it wasn't that much important

II. Oral Discussion of "The Ant and the Dove"

[I: will you please give me your code number

C: 316

I: all right 316 now in your own words I would like you to tell me the story of the ant and the dove]

C: once upon a time there was this ant that lived in the forest and uh one day it found this uh apple laying on the ground and it rolled it into its house and put it on uh close to its bed where some others were and when it went out well it got a ride on this thing uh locust or something and uh then it it uh got on to this snail this snail was supposed to be first and after it got on the locust the locust went flying up in the air well uh he fell on to this leaf and uh close to this river and then he fell down into the river and uh he kept on thinking that he was going to drown and uh this dove was up in a tree watching and she came down with uh a leaf in her mouth and laid it on the water and the ant climbed up on it and got ashore and uh she got this other apple and broke it in two and took it into his house and one day uh he came out of his hole and he was just coming out and he saw these big feet walking by and they were a hunter and the hunter saw the dove up in the tree and he was

getting ready to shoot him and the little ant ran back into the house and got some tweezers or something like that and he ran up to the man and at the very second when he was going to shoot well he pinched the man on the leg and the man dropped down and the dove woke up and flew away

[I: is that all you remember all right do you think this story shows that one good turn deserves another

C: (no sound)

I: explain why you think so]

C: well because the dove helped the ant so it should help it

III. Written Discussion of "The North Wind and the Sun"

Name 316 Sex M Age 8 Grade 3

[(1) In your own words tell the story of the North Wind and the Sun.]

One day the North Wind asked the Sun to have a test to see which one was the best. So the Wind went first and blew some trees right out of the ground and knocked off a house top. Then he knocked a frog off a rock and into the river. Then he made some great big waves. Then it came the Sun's turn. The sun made some flower plants come up and it was getting warm for the man in all his wraps so he took them off and threw them on a tree lim. Since the Wind had lost he went off griping.

[(2) Which do you think is more powerful, the wind or the sun? the sun]

[(3) Why do you think so?]

because the sun waz hotter and made the man take off his wraps

[(4) This story is supposed to show that you can sometimes do more by being gentle than you can by using force. Do you agree or disagree with the idea that gentleness is sometimes better than force?] gentleness is better

[(5) Explain your answer and give examples to support it.]

because you might not be as smart as you think you are. One day my friend asked me to have a race and If he won I would have to give him a nickel but if I won he would have to give me a nickel. We raced and I won but I told him not to give me the nickel.

IV. Written Discussion of "The Ant and the Dove"

Name 316 Sex M Age 8 Grade 3

[(1) In your own words tell the story of the Ant and the Dove.

The Ant and the Dove]

Once upon a time there lived a ant. One day when he was walking along he found an apple and took it back to his burrow, and rolled it over close to his bed. Then he got a ride on a locust. When they got up in the air the ant fell off onto a long peace of grass that was hanging across a river, then he fell into the river and stayed for about five minutes. A Dove saw him almost drowning. The Dove got a leaf and dropped it into the river and the ant got on and reached the shore safely. Then the ant got another apple and broke it into peaces and put it where he put the first one. When the ant got up out of the hole he saw great big feet on the other side of the bushes, he watched the man and saw him aim the gun at the Dove. So he got some tweasers and just as the man was about to shoot the Dove the ant climed up the man's leg and peanched the man, the man droped the gun, the Dove woke up and that's all I can remember

[(2) Do you think this story shows that one good turn deserves another?

yes]

[(3) Explain why you think so (or do not think so).]

if the Dove did something for the ant the ant should do something for the Dove.

[THE END]

APPENDIX C

Samples of Processed Analysis Sheets

LINGUISTIC ANALYSIS WORKSHEET

1 3 grade 2 16 student number 3 — 4 X male — female 5 X oral — written

T-UNIT: well (uh) he fell on to this leaf and (uh) close to this river

6-8 8 T-unit number
9, 10 12 words in T-unit

11 0 mazes
12 0 false starts
13 1 attention claimers, etc.
14 0 redundant subjects

15, 16 Sentence Patterns
- ✓ 1 S V
- 2 S V O
- 3 S V C_n
- 4 S V C_a
- 5 S V I O
- 6 S V O C_n
- 7 S V O C_a
- 8 Adv V S
- 9 There V S
- 10 It V S
- 11 No V_p
- 12 N_1 V_p
- 13 Question
- 14 Request, command
- 15 Partial, Non-standard

17, 18 1 SENTENCE COMBINING TRANSFORMATIONS

Description of Transformations

19, 20 I Nominal Structures
A Type
1 Headed
- 21 a N + N
- 22 b N + adjective
- 23 c N + possessive
- 24 d N + relative clause
- 25 e N + Ø relative clause
- 26 f N + prepositional phrase
- 27 g N + infinitive phrase
- 28 h N+ participial phrase
- 29 i N + adverbial
- 30 j other

2 Non-headed
- 31 a noun clause
- 32 b prepositional phrase
- 33 c infinitive phrase
- 34 d infinitive with subject
- 35 e gerund phrase
- 36 f other

B Function
- 37 1 subject
- 38 2 object
- 39 3 indirect object
- 40 4 subject complement
- 41 5 object complement
- 42 6 appositive
- 43 7 object of preposition
- 44 8 adverbial noun
- 45 9 other

46, 47 II Adverbial Structures

48 A Adverbial Clause
- 49 1 time
- 50 2 place
- 51 3 manner
- 52 4 cause
- 53 5 condition
- 54 6 comparison
- 55 7 reduced comparison
- 56 8 the more the merrier

57___ 9 adjective complement
58___10 other

59___B Sentence Adverbial
60___1 absolute construction
61___2 interjected clause
62___3 other

63___C Adverbial Infinitive

64, 65 /III Coordinate Structures

66 /A Modifiers
67___1 adjectival
68 /2 adverbial

69___B Nominals

70___C Predicates
71___1 V
72___2 V O
73___3 V C_n
74___4 V C_a
75___5 V I O
76___6 V O C_n
77___7 V O C_a
78___8 other

79 Analyst: D. S.

LINGUISTIC ANALYSIS WORKSHEET

1 2 grade 2 16 student number 3 4 X male ___female 5___oral X written

T-UNIT: One day when he was walking along he found an apple and took it back to his burrow, and rolled it over close to his bed.

6-8 1 T-unit number
9, 10 26 words in T-unit

11 0 mazes
12 0 false starts
13 0 attention claimers, etc.
14 0 redundant subjects

15, 16 Sentence Patterns
___ 1 S V
✓ 2 S V O
___ 3 S V C_n
___ 4 S V C_a
___ 5 S V I O
___ 6 S V O C_n
___ 7 S V O C_a
___ 8 Adv V S
___ 9 There V S
___10 It V S
___11 No V_p
___12 N_t V_p
___13 Question
___14 Request, command
___15 Partial, Non-standard

17, 18 5 SENTENCE COMBINING TRANSFORMATIONS

Description of Transformations

19, 20 2 I Nominal Structures
A Type
1 Headed
21___a N + N
22___b N + adjective
23 2 c N + possessive
24___d N + relative clause
25___e N + ∅ relative clause
26___f N + prepositional phrase
27___g N + infinitive phrase
28___h N+ participial phrase
29___i N + adverbial
30___j other

2 Non-headed
31___a noun clause

32___b prepositional phrase
33___c infinitive phrase
34___d infinitive with subject
35___e gerund phrase
36___f other

B Function

37___1 subject
38___2 object
39___3 indirect object
40___4 subject complement
41___5 object complement
42___6 appositive
43 2 7 object of preposition
44___8 adverbial noun
45___9 other

46, 47 / II Adverbial Structures

48 / A Adverbial Clause
49 / 1 time
50___ 2 place
51___ 3 manner
52___ 4 cause
53___ 5 condition
54___ 6 comparison
55___ 7 reduced comparison
56___ 8 the more the merrier
57___ 9 adjective complement
58___10 other

59___B Sentence Adverbial
60___1 absolute construction
61___2 interjected clause
62___3 other

63___C Adverbial Infinitive

64, 65 2 III Coordinate Structures

66___A Modifiers
67___1 adjectival
68___2 adverbial

69___B Nominals

70 2 C Predicates
71___1 V
72 2 2 V O
73___3 V C_n
74___4 V C_a
75___5 V I O
76___6 V O C_n
77___7 V O C_a
78___8 other

79 Analyst: D. S.

SOME CONCLUSIONS OF THIS STUDY

This study confirms earlier comparable investigations that among school age children there is a general positive correlation between advances in grade and increasing word-length of total responses to a situation.

Largest overall increases and most frequent statistically significant increments from grade level to grade level were found in the use of coordinate constructions within clauses, of subclausal adverbial constructions, and of nominal constructions containing adjectives, participles, and prepositional phrases.

Deletion transformations may be better indicators of development than are subordinate clauses.

The fastest progress in development of oral expression appears to occur in the time spans between kindergarten and the end of first grade and between the end of fifth grade and the end of seventh.

Unexpectedly uniform evidence shows that in the higher grades advances in control of syntax in writing are accelerated far beyond those reflected in speech.

A simple, objective, and apparently valid measure of development of syntactic control is mean word-length of T-units (single independent predications together with any grammatically attached subordinate clauses).

Earlier studies indicoted the linguistic superiority of girls over boys at comparable ages. Contradictory evidence now accumulating probably reflects a change in environment that has reduced differential behavior.

NCTE RESEARCH REPORTS

No. 1. *The Language of Elementary School Children* by Walter Loban

Stock No. P56-70. Price $1.25

No. 2. *The Responses of Adolescents While Reading Four Short Stories* by James R. Squire

Stock No. P56-68. Price $1.50

No. 3. *Grammatical Structures Written at Three Grade Levels* by Kellogg W. Hunt

Stock No. P56-101. Price $1.75

No. 4. *An Examination of the Attitudes of the NCTE Toward Language* by Raven I. McDavid, Jr., editor

Stock No. P56-103. Price $1.50

No. 5. *Problems in Oral English* by Walter Loban

Stock No. P56-105. Price $1.75

No. 6. *The Effect of a Study of Transformational Grammar on the Writing of Ninth and Tenth Graders* by Donald R. Bateman and Frank J. Zidonis

Stock No. P56-109. Price $1.00

No. 7. *Responses of College Freshmen to Three Novels* by James R. Wilson

Stock No. P56-119. Price $1.00

No. 8. *Syntax of Kindergarten and Elementary School Children* by Roy C. O'Donnell, William J. Griffin, and Raymond C. Norris

Stock No. P56-133. Price $1.75